

# SUPPLEMENT.

## The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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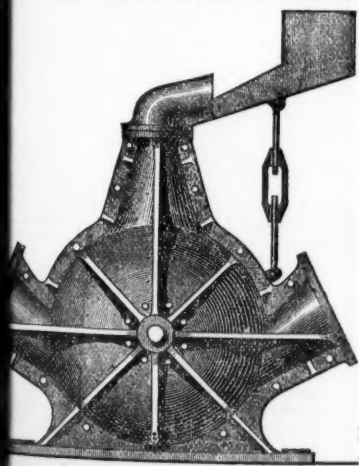
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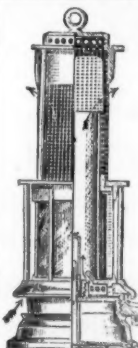
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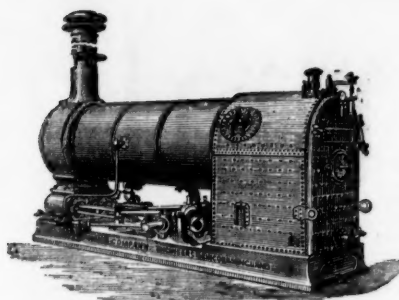
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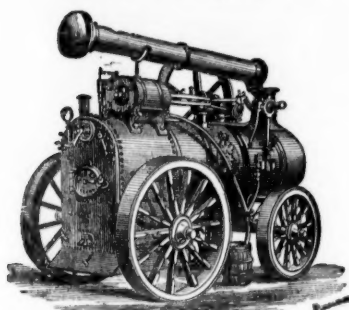
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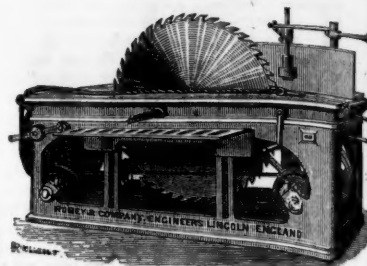
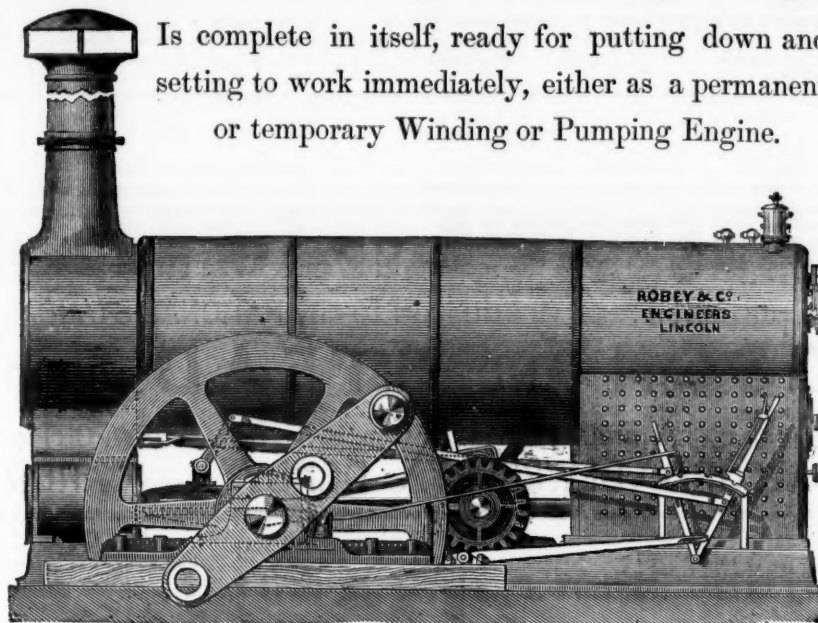
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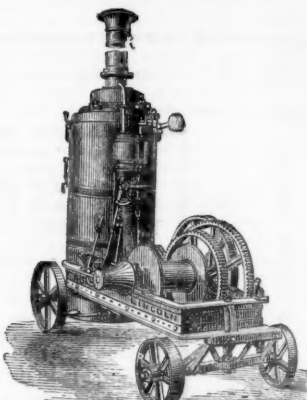
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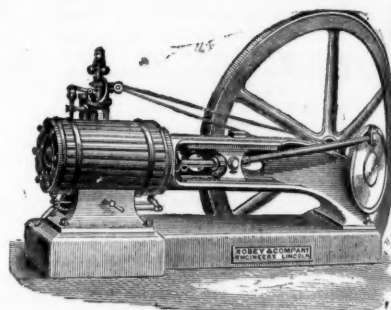
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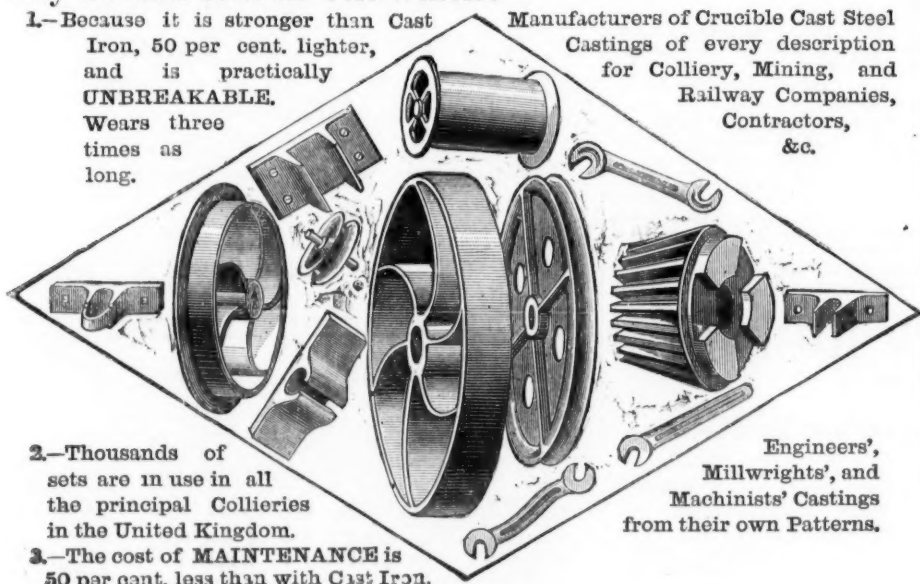
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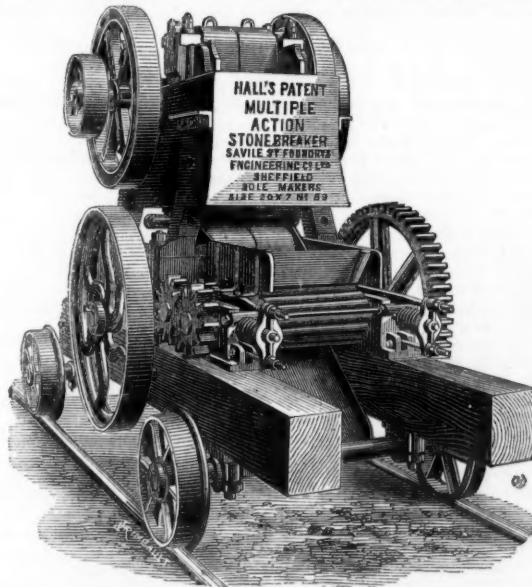
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## Original Correspondence.

## A NARROW GAUGE RAILWAY BETWEEN WREXHAM AND MINERA.

SIR.—The Shrewsbury and Chester line, now Great Western Railway, passing over the mid-portion of the North Wales coal field past Ruabon and Wrexham, gave the industries on the route a powerful impulse. In former days the consumption of the various products was limited to haulage by cart and boat, which, it seemed, kept the trades within short compass. Works were on a small scale, and there prevailed an impression about the capabilities of the ground to the effect that no commodities could be raised or manufactured in sufficient quantities to recoup the money provided to extend them. The introduction of the railway altered this state of things. New and enlarged markets became reachable on all sides, infusing new life into every industry, and benefiting capital and labour together. Of course in the markets of the world there is rivalry and sharp competition, so there must be constant watchfulness to find new sources of consumption or new fields of supply to support, as it were, the equilibrium in trades. The general public would diminish and towns be dissolved if it were not so. The balance is, however, sometimes on one side of the law of supply and demand, and then on the other, and this arrangement keeps commercial activity always on the alert.

Directly after the trunk line was made past Wrexham a mineral branch was opened by way of Wheatheaf to accommodate Brymbo, Westminster, and Vron Collieries, and the Minera Lead Mines. This movement opened the door of prosperity to these works by enabling them to compete, with a large measure of success, in the markets of Birkenhead and Liverpool with their more privileged neighbours from Wigan and St. Helen's. This branch line also made the limestone available in Minera, causing to rise there one of the largest manufacturing for lime in the whole country. The exigencies of the coal trade in a few years required greater accommodation and a less cumbersome road than the one adopted at first. Under these circumstances a second branch was made past the Union workhouse and up the South Sea Valley, whereby the heavily freighted trains come sooner on the main line. This branch passes through the heart of the coal population—a people who enjoy a run to Wrexham two or three times a week for recreation, and one wonders who can blame them. Contact with town life must have influence for good upon country people. The town has several resources for edification and amusement—to wit, Natural Science meetings, free library and reading-rooms, popular lectures for the people, high-class and yet cheap concerts, cricket, and other athletic sports. While the young men go for these things the seniors go for business. It was partly promised that this second branch line would be adapted to run passenger trains, but the expectations of the district in this respect have not been realised up to the present time, save only a train one way per week, late on Saturday nights, to take the last batch of the market people home with their week's supplies. This little concession may show a leaning to support a local passenger business, but it is supposed that they cannot concede more in this direction owing to the extensive coal traffic absorbing all the room. There may be another reason. The cramped condition of Wrexham station may be an obstacle in the way of bringing the outlet of another line into the place; and if the South Sea branch adopted a daily passenger traffic there would be necessity for a new siding for the purpose. If the things be so it is unusual for the Great Western Railway to keep back at so small a matter. Any way, something prevents the opening of the line for passengers. Such being the case a project is set on foot to supply accommodation from another source. References have been made already to show how railways pioneer extensions in trade.

The proposal is to construct a narrow gauge railway, which will at the same time open fields for new industries in the district. The line will be in harmony with the Great Western Railway, because it will act as a feeder for it, and not in opposition. The following remarks will explain the scheme:—In the first place let us glance at the public cars which ply between the mining districts and the town of Wrexham. On Saturdays 26 of these traps come in; Thursday brings the same number; Friday and Wednesday 12 each; on Tuesday 14; and Monday 13. They are estimated to carry ten passengers a piece, and sometimes two or three journeys are made in the day. In single file there might be no less than 150 engagements run in the week. A long array of private vehicles also come from the same neighbourhoods. These figures disclose the fact that a large proportion of the population is moving about for business or pleasure, or both, every day. A railway would treble the number of passengers per week in less than 12 months. The narrow gauge will start from the field west of the railway bridge at Wrexham Station, and strike past the House of Industry, follow the course of the brook, and at a convenient site mount over the sidings of the south sea branch, and keep on the west side until it comes near Broughton farm, at which place it is proposed to branch off a length of two miles or so to accommodate Poolmouth, Moss, Cerney, Brymbo, Summer Hill, and the hamlets adjoining, one station being planted at the public road near Broughton, and another at the terminus of the branch in Brymbo. The main route will continue forward from Broughton, pass near to Glanrafon, and land by an S curve on the flat land in the vicinity of Tyn-y-Coed, where a station would be placed for Adwy. From here the line will go by an easy gradient past Talwrn Colliery, connecting that old establishment with the route as conveniently as possible for the sake of the country beyond, which has been trading with those works for many years. Leaving Talwrn it will proceed to the Twenty Houses, where will be erected a first-class station for the service of Minera, Coedpoeth, and the Nant on one side, Geginddu and Penrhos on the other. Thence the line will go forward, passing at the back of the Miners' Arms, go right up the valley, and sweep round the Bwlchgwyn headland into the higher part of Nant-y-Ffrith, where a station will be placed for Bwlchgwyn village, Pentresaeon, the upper end of Minera, and the district round Rhyddallog. The line will pass on to the Four Crosses, at which place it is proposed to throw out a branch for a distance of two miles or so over some cheap mountain land, with moderate gradients, for the purpose of working a particularly valuable limestone, situate in lands belonging to Sir W. W. Wynn, Bart. It has been proved for lime, and only wants access to the market to become a favourite, because of its superior quality; and to say it will be able to stand the strain of rivalry with the very successful Minera Lime Works is one of the best recommendations in its favour. Out of this latter branch will go out a length for about a mile to serve the Park Mine. A word may not be out of place here with respect to this mine. Extensive operations have been promoted here without interruption for well nigh 40 years, spending a massive fortune in developing the ground. The works have at last reached a position which may be regarded as the key to the ore-bearing points in the sett, and the venture is placed on a safe basis for the future. This is an instance of mining under oppressive difficulties, depressed markets not being the worst. The company deserve well, and it is the ardent wish of the whole country that their herculean efforts may be rewarded with returns at no distant day in an ample manner. It is pleasing to note the prospects are brighter than at any former time. An instance may be quoted in this place of the benefit of railway communication. The Park Mine pays 6s. per ton for carting their coal from the pits, while the Minera Railway carries coal to the Minera Mines for a rate of 1s. per ton, and 6d. wagon hire. Again, the one company pay 2s. 9d. per ton for the cartage of their ore to the railway siding, whereas the other saves this item, because the railway comes to the door of its ore bin. Coming back to the Four Crosses, the main line will run on the north side of the turnpike road, skirting Mynydd Bychan, a mountain if you like of siliceous sand, bend to the Crown Inn, and make for the village of Llandegla, where it will terminate at present.

The works will be arranged for extension into the Vale of Clwyd as increased traffic and the wants of the country may call for it. Besides the cases adverted to the line will render other sources available. The sand in Mynydd Bychan is the same sort as that which is quarried at Llanarmon, carted to the railway at Treiddyn, and conveyed to St. Helen's. The Mynydd Bychan formation will quarry

cheaply, and a railway passing over the premises would very soon link it with the Lancashire Glassworks. Not long ago a commissioner came round to search for this material, and said he could find a market for many hundred tons per week if there were facilities to take it away. The iron ore in the Nant-y-Garth, about a mile outside Llandegla, is another industry. The ore is good quality, and a start was made to work it a few years ago, but abandoned on account of excessive haulage. Improved accommodation will, no doubt, realise a busy traffic with the ironworks at Ffrwd, Brymbo, and Ruabon. The Llanarmon Mines are another source; at present this name may be objected to as a misnomer, but if the circumstances of the place be considered the appellation will be found to be appropriate. Operations are carried on there only on a small scale, not through lack of productive lodes, but entirely because there has been no chance hitherto to get fuel for pumping machinery at any reasonable rate. The idea never gained access into the heads of miners to bring coal up there in carts, the futility of the practice was too apparent. With a railway running near the place it would be turned into a hive of industry; more encouraging still the prospects would be, seeing that the mines will be wet and deep, if a place were found in any of the valleys adjacent, or even at some distance off, where an adit may be launched out for the purpose of draining the whole field by gravitation. Economy must be a feature in the conduct of future mining, more so, perhaps, than at present, and whatever can reduce cost, mechanical or manual, must be adopted as the first requisite.

Turning for a moment to points of natural beauty, it may be said Bwlchgwyn, Minera, and Nant-y-Ffrith will be scenes for pleasurable excursions from Wrexham in the summer season, and few railways can bring "industry" and Nature into such close proximity without letting the one suffer from what is sometimes called the defilement of the other. A day spent in visiting these places would afford profit as well as holiday enjoyment any time. The famous lead mine, limestone quarries, and limeworks in Minera will supply studies for the miner, geologist, and mineralogist, while those who have special taste for landscape can be gratified without stint. The heights of Bwlchgwyn will give the visitors command of noble views of the Welsh hills, and also of vast extent of country spread out as a picture before them. The Nant-y-Ffrith gorge, which is called one of the most unique ravines in the kingdom, is likewise within sight, and on one side of it rises Hope Mountain to a considerable height, which also commands a lovely and extensive prospect, a natural panorama of the country, if you will, once seen never to be forgotten. These things are mentioned to support the view that the little railway will be a busy rendezvous for excursionists.

After this little digression attention must be given again to daily traffic. Another source is Craig-y-Corn, on the Bwlchgwyn promontory. This is a rock containing a large percentage of flint, where the stone is prepared for road-metals, which competes effectually with every other where it has been tried. The capacity of the rock is unlimited, but the stone has not reached the regular centres of thoroughfares on account of the present slow cartage. The new railway going past will not fail to alter the whole tenor of the business and create a steady traffic. It is believed the proprietor is prepared to introduce a mechanical stone-breaker to meet the demand consequent upon improved facilities for taking away the supplies. The traffic in coal has been mentioned only in connection with Talwrn Colliery, and it may be stated there is no intention to divert any coal save the portion that will be required in the country westward, where the standard gauge is not prepared to go. The line is, however, projected to serve Gates Wen and Plasnew Collieries as well, because ultimately the Welsh coal must go from these pits into the Vale of Clwyd markets, where it is fully believed it can be put at a cheaper figure, because shorter freightage, than from any other place. If the vale had been a manufacturing centre the engineering difficulty with expensive works on the standard gauge would not have stood in the way of connecting Wrexham with it long since, but it is not so fitted; rather its distinction is bound up with agriculture, and one may see even in this qualification something to stimulate the construction of a narrow gauge line between the two places, because such a line is practicable over the hills, and will fully supply the much needed facilities for extensive farming produce going to an acceptable market. Passing with a simple allusion the matter of cheap fuel for lime burning, which will conduce to the improvement of much land on the hills, two things may be mentioned in connection with the above view of the subject—namely, the barley grown in the Vale of Clwyd and the fairs held in Wrexham. Of these fairs two are held in each month, and it is notable what large bodies of live stock come over Llandegla and Bwlchgwyn on these occasions, so that these busy periods would form a considerable item in the traffic roll. Wrexham, again, is a great mart for barley, and most if not all this grain finds its way there out of the Vale of Clwyd. On many other occasions the new line would become a busy thoroughfare by a short cut to Wrexham and Chester.

These things point to what may be done if the line were made through, but at present the proposal is to make the terminus at Llandegla. The total length is 16 miles, including branches, and the estimated cost about 2000l. per mile. The existing traffic in the district will yield at least 10l. per mile per week of gross receipts throughout the year. This low return might discourage at first sight, but it must be considered how the Vale of Llangollen Railway stood when it started its career on an estimated return of 20l. per mile per week, and the cost of making it was at the rate of 9000l. per mile. Then there is the constant encouragement how quickly recuperative forces show themselves in public traffic on the lines of railway.

Looking on the proposed line as a whole, there are no engineering difficulties in the way. The heavy parts will be the bridge over the sidings at Croesnewydd, the S curve at South Sea, and the sweep past Bwlchgwyn. None of these are obstinate, while practical gradients can be obtained in all cases. According to the foregoing remarks the sources of traffic will embrace passenger, coal, limestone, lime, iron ore, sand, metallurgical stone, some live stock, and farm produce; and these will be found in ample proportions to mark the enterprise as a profitable investment, and justify the line. On the question of land it is expected that Mr. Fitzhugh, who is one of the largest owners, will not object to the line, because of the benefit it will confer on the neighbourhood by the improved means of travelling, and by the stimulus it will give to several new sources of industry now lying dormant through lack of communication with acknowledged markets. Will the district respond? J. HUMPHREYS.

Chester, July 28.

THE GREAT NORTHERN AND THE MIDLAND RAILWAYS.  
THE REVERSE SIDE OF THE LEEN VALLEY MEDAL.

SIR.—The reverse of a Raphael, Titian, Murillo, Rubens, &c., is canvas. Pagan art only saw its ideal in the beauty of form—Venus, Apollo, Jupiter; whereas the Christian artists' was in depicting the expression of the soul. It is no hyperbole or paradox to assert that the ideal of the administrators of existing and prospective railways, the absorbents of the preponderating amount of treasure of the United Kingdom, is a remunerative return for the invested capital, it being by no means a chimera to forecast the materialistic reverse of the medal in this case as a natural result of the renewed inroad of the Great Northern into the self-constituted domain of the Midland, the most recent irruption, the Leen Valley. Can it be a matter of surprise if the Midland, with the ubiquitous energy and perspicuity of its late general manager, now the presiding genius at the board of direction, the reverse of the medal of the Leen Valley campaign, eschewing the "mal sonnant," or invidious term victory, be not the introduction of a line by the Derby board next session to Boston Deepes, from which the Midland system is already within 32 miles and less. My contribution to your columns of July 17 foreshadowed the drift of the present emanation.

On the entire English east coast there does not exist such a natural, deep water, perfectly sheltered dock as Boston Deepes, where from time immemorial and at present the largest ships discharge and load, the natural outlet of the Yorkshire, Derbyshire, Nottinghamshire, and Leicestershire coal output, with especial reference to the metropolitan coal supply, an official return from Jan. 1 to June 30 this year, showing an increase of 151,969 tons seaborne, and a decrease of 253,688 tons by rail, and the general coal export and timber and grain import "Les premières impressions ne s'effacent jamais,"

which, in the event of proving true with regard to Sutton Bridge Dock on the part of the creative genius of the Great Northern, Boston is necessarily compelled to throw herself, in self preservation, into the arms of the Midland, Boston offering incomparably greater advantages to Sutton Bridge in every respect. I exclaim with full "connaissance de cause" that Boston with the proposed undertaking is an invaluable prize worth possessing by any railway connected with precluded coal fields, and the manufacturing districts generally.

The most astute calculations and irrefragable practical data demand, in view of the weighty interests involved, that "prepare for action" be signalled from the maintop, and the tompions be no longer allowed to rest peacefully in the muzzles. The catastrophe, or rather "cataclysm," can be staved off by the Great Northern awarding to its only port, Boston, what it has, I will not say wantonly, but in ignorance, done to a foreign port, that is a port quite out of its special district. My correspondence in the *Mining Journal* of July 10, 17, and likewise this week, I crave reference to, of which recapitulation would be inadmissible. Boston is the grand future of the Great Northern Railway Company, and it will be entirely their fault if they allow "qu'on coupe l'herbe sous le pied."

With the largest coal field in Great Britain, Wales only excepted, and with the capability of delivering the said output in the Metropolitan at a saving of upwards of 6s. a ton, and in Paris of 10s. a ton, as explained in my lengthened contribution to the *Journal* of July 10, Boston is destined to become the most important coal, wood, and grain port on the East Coast, offering the "seule planche de sauvegarde" of the immense capital invested in precluded coal districts. Little Tower-street, July 29. W. J. THOMPSON.

## BOSTON, SUTTON BRIDGE, WISBEACH, AND LYNN

SIR.—My contributions to the *Mining Journal* of July 10 and 17 treated exhaustively the coal shipment, and far from superficially the import of wood at Boston Deepes. The Great Northern Railway Company have increased their subscription to Sutton Dock from 20,000l. to 55,000l. (the Midland refusing to join them, presumably with an ulterior view to Boston Deepes), the Great Northern giving evidence in their Bill just passed through Committee of the House of Lords, "Boston is a very bad port, we cannot get big ships to it." I adduce the Boston Harbour Master's certificate to prove that steamers engaged in the coal trade from the Tyne to London loading upwards of 1000 tons can load up at their coal shipping stage, Skirbeck Quarter, Boston. I can further prove that all the coal the Great Northern can convey from the collieries they have or may gain access to in Yorkshire, Derbyshire, Nottinghamshire, or in Leicestershire can be shipped day by day on board of steamers of light draught at such stage and delivered into consumers' premises in London, in both cases at many shillings under cost of railway conveyance and attendant charges. My reasons for Boston Deepes are based upon the combined coal and wood traffic. Wood can be delivered by the proposed large steamers at a moiety of the long prevailing and existing freight from the Baltic, &c., to Lynn, Wisbeach, or Sutton Bridge and Boston.

I have visited every wood shipping port in the Baltic many times (thoroughly conversant with the languages of Russia, Finland, Sweden, Norway, and Prussia), by post horses, and existing water-post system, where roads are impracticable, from Drontheim to Christiansand, and thence by post horses and my own carriage, sledge, or post-boat; every Norwegian, Swedish, Finnish, Russian, and Prussian port. I am compelled to name this in detail to show that apart from having been managing owner of British and foreign shipping, I possess elements to substantiate my calculations and data. During the "Hudson Railway era" I purchased more wood in the Baltic than any other firm.

A strong feeling is evinced in Boston in favour of the Midland Railway Company gaining direct access to Boston, which, however, is untenable, provided the Great Northern divest themselves of partiality towards a vastly inferior port, which must succumb to Boston Deepes, to the great discomfiture of Great Northern shareholders. Little Tower-street, July 27. W. J. THOMPSON.

## COLLIERY VENTILATION.

SIR.—In Col. Shakespear you have a standing correspondent on a very important question of how best to ventilate fiery collieries. This Colonel in a very wholesale manner condemns the lamps now so generally in use, and advocates an entire reversal of the present system of intake and exhaustion. Now Col. Shakespear, I believe, is the principal proprietor of a fiery colliery, and has been so for several years past, at Pentre Rhonddu. The lamps in use at this colliery are in accord with those in use at other collieries, and the system of ventilation is not varied. Would it not be well that Col. Shakespear should, in his own colliery, practically demonstrate the superior advantages of the system he has so long advocated? This would be practical proof as against theory. I prefer the former. July 27. A MONMOUTHSHIRE COLLIER.

## ELECTRICITY V. COLLIERY EXPLOSIONS.

SIR.—The occurrence of another fatal colliery explosion causes one to consider whether something cannot be done, by means of electricity, to prevent them. I think something may be done. I think, with the assistance of colliery managers and mining engineers to guide us in our labours, we may be able to arrange an electrical apparatus that will give sufficient warning to enable such precautions to be taken as will avoid an explosion. In the first place I would ask mining engineers and colliery managers—

1.—With how much warning can you prevent an explosion?  
2.—Is there any force present in colliery explosions, such as an increase or decrease of pressure on the barometric column, or an increase or decrease of temperature?  
If either of these forces or anything analogous be at work, and by its means we can ensure a column of mercury or a steel spring being forced through a very small fraction of an inch, the following plan may be carried out. The length of time warning that the apparatus will give must necessarily depend upon the amount of information we can obtain as to the phenomena immediately preceding an explosion. My plan is as follows:—Let a good loud alarm bell (electric trembling bell) be fixed at each point to which it is desirable that an alarm should be given—say, in the fan, winding and engine houses, at the pit bank, at the pit bottom, at the entrance to each road, and to each heading, and let the bells be connected with a battery or dynamo-electric machine on the bank, and with an apparatus consisting either of a column of mercury or other suitable arrangement to make or break the electric circuit, when either the pressure reached a certain fixed limit, or the temperature rose above a certain degree, or any other force that may be discovered to have passed its limit of safety, and with wires in such a manner that immediately on the limit above referred to being reached the whole of the bells would ring simultaneously, and would go on ringing either till stopped by hand or till the conditions of safety had been restored. I am aware that two principal objections will be raised:—

1.—Expense: On this head I submit that the cost of erection and maintenance for ten years would not exceed 1-1000th part of the cost of an explosion.  
2.—The difficulty of maintenance and of ensuring that the apparatus was always in proper working order: This difficulty would disappear as soon as it was fairly met. We should arrange the apparatus so that a glance at a dial in the engine house, fan engine, or any other desirable place, would show as certainly if the apparatus was in order as do the movements of the hands that a clock is going. Further, it would be in the power of each deputy and underviewer to test each and every part of the apparatus at any time, and this should be done as regularly as the examination of the rope. Also, any breakage of the wires in any place would cause the alarm to commence ringing, and should any accident happen to any particular bell that bell would commence ringing by itself.

A dial as above described might be placed in the manager's office, and if required also in his house. There would be no difficulty about the wires. They should be stout copper wires, thickly covered with gutta percha. They should be fixed well out of the way and protected with wood boarding. Any exposed places should be examined periodically, and in case of alterations fresh wires should be fixed



temporarily in another position while the alterations were being made. The battery, if one was used, would be of a very simple construction, and it would literally call out when it required attention. If a dynamo-electric machine was used the same would suffice to work all the electric signals in and about the colliery.

I hope this letter may serve to direct the attention of mining engineers and colliery owners to the subject.

Nottingham, July 26.

SYDNEY F. WALKER,

Member of the Society of Telegraph Engineers.

#### COLLIERY EXPLOSIONS.

SIR.—Since the occurrence of many disastrous explosions in South Wales within a recent period those concerned with coal mining have been, no doubt, making strenuous endeavours to find out a cause for these accidents. The recent explosion at Risca seems, to an outside observer, to be shrouded in mystery, though the fact of a lamp having been found which appeared to have been damaged by a pick may account for the explosion of the large quantity of fire-damp that must have been present in the mine. Whether this fire-damp had been gradually accumulating owing to some defect in the ventilating arrangements, as to doors, closing or contraction of some airway (a condition to which the airways in the mines of South Wales are peculiarly liable, and on that account require to be attentively watched), or the presence of fire-damp was the result of a sudden outburst, in any case it is hoped that an investigation into the matter will lead to some effectual means being adopted to prevent further calamities.

The coal mines in South Wales are not considered to be subject to sudden outbursts of gas; if this be so, it may be concluded that the late explosions are the result of gradual accumulations of gas, the primary cause being a more or less contracted state of the airways. Sudden outbursts of gas (called blowers) have occurred in the mines of the North of England; but the mines of South Yorkshire are peculiarly subject to them; they have given cause of considerable alarm in many cases to the miners, in other instances they may have resulted in heavy explosions. The writer gives a few instances of sudden outbursts of gas, showing the source from whence the issue of gas came, and the means devised to prevent a recurrence of such accidents. Possibly, when the matter is looked into, there may exist in the Risca Mine similar conditions to those found in South Yorkshire to account for the unexpected appearance of a large quantity of fire-damp, although the breaks in the floor, hereafter referred to, may have occurred in the goaf, where they are hidden from observation.

A sudden issue of fire-damp occurred at Willington Colliery, on the Tyne, in the early part of the year 1843. The Bigge Pit,  $\frac{3}{4}$  ft. diameter, was the downcast for the colliery. The accident occurred in the Bensham seam, the depth to this being 140 fms. The upcast was situated 550 yards to the eastward. The effect of this issue of fire-damp was to foul the return air current; two persons were working in this air-way—one of them using a Stephenson lamp, the other a Davy. As soon as the explosive mixture reached these lamps the result was the immediate extinction of the Stephenson lamp, while the Davy lamp continued to burn, gas exploding within the lamp; but they managed to get away with it without causing an exterior explosion, owing probably to the air current not being of much velocity. An examination being afterwards made to find out the cause of this issue of fire-damp, the manager of the mine came to the conclusion that it had come off near the face of the north roadway, where a crack in the floor was visible, from which some water had flowed, but the issue of gas had then almost ceased. It was strongly suspected that gas existed at very high pressure under the Bensham seam, proceeding from a seam of coal 12 in. thick lying 21 ft. under it. To prove this a  $\frac{3}{4}$  in. borehole was put down in the same locality to the 12 in. seam, which was got March 1, 1843, when a strong blower came off, continuing for 41 days. On March 27 the pressure had sensibly diminished, and on April 10 the issue ceased. No experiment was made to test the pressure of the gas at the first or any subsequent period, but the noise when it was first tapped resembled high pressure steam blowing off from a boiler. The Bensham seam was 4 ft. 8 in. in height. The gas blew forcibly against the roof, but was carried away immediately into the return by the current of air passing through the roadway. The blower could be approached within 2 yards of the windward side with safety.

At a neighbouring colliery to Willington where similar difficulty and danger existed with regard to great pressure from below a borehole was put down, and a pipe with gauge attached to it was fixed on the top of the hole. In this case the pressure of the gas had risen to 45 lbs. per square inch when the apparatus gave way and no further observation was made, though undoubtedly a much higher pressure would have been indicated with proper apparatus.

There have been two instances of sudden outbursts of gas at Stratford Main Colliery, Yorkshire, the particulars of which have been given by the manager of that colliery. The first occurred on Oct. 1, 1867; the second on Aug. 31, 1870. It may be observed that, besides these, many sudden outbursts of gas have occurred in Derbyshire and Yorkshire, in the Silkestone and other seams, most, if not all, these being attended with the breaking up or bursting of the floor of the seam. These outbursts have been a cause of great anxiety to managers of mines. From experience of the past an insight has been gained as to their cause, so that proper measures are now taken to prevent such occurrences. The Government Inspector's reports for late years bear out the statement that these mines are less subject to explosions of fire-damp than formerly.

At Stratford Main Colliery the outbursts of gas occurred in the Silkestone seam, which is about 6 ft. in thickness, 240 yards in depth, with a good metal roof. The system of longwall work is adopted, the main roads being protected by pillars of coal. In 1867 ventilation was effected by means of furnaces, these being fed with fresh air, and the quantity was ample for the requirements of the mine. The first outburst took place in a part of the mine where several men were employed. Some four hours previous to this symptoms of disturbance by the weighting of the roof were heard. The outburst at last came away suddenly, and with great violence, from a crack in the floor 40 yards or more in length, and extending across three gateways. The discharge of gas backed the current of air passing along the face of 4200 cubic feet at 140 feet velocity per minute. It overpowered and prostrated several of the men, who were afterwards rescued, and extinguished all the lamps, which were of the Stephenson type. Some of these may have been extinguished by gas almost pure. It was calculated that galleries of 25 square feet area and 2000 yards in length were charged with fire-damp. This appears to have travelled with the air at a greater speed than the workmen travelled, and to have moved against the current for a distance of over 100 yards. A current of 17,000 cubic feet per minute was explosive for six hours after the occurrence. When this joined another current of 8000, making 25,000 cubic feet in all, the mixture was not explosive. In 13 hours from the outburst the current along the face of work was not explosive; and in 54 hours no explosive gas was seen except at the break in the floor. The break ran in a line parallel with the face; the floor near too it was lifted considerably. Metal props and chocks were broken by the pressure from beneath.

In 1873 the second outburst took place, issuing from a crack in the floor near the face, 60 to 70 yards in length, in the same locality as the first. The floor was lifted in a slight degree, the roof was not broken, nor any props or chocks, except at one point, where gas came off strongly. This occurrence was accompanied with a sudden breaking at the face, a rush of air and dust, and the firing of gas in the lamps, which quickly became extinguished. A current of 10,000 cubic feet per minute was rendered explosive for the space of four hours. In three days the issue of gas ceased except at one part of the crack.

In the ordinary course of working little gas is given off from the Silkestone seam, the danger to be apprehended arises from beneath, and to counteract this a borehole was put down with the same object in view as at Willington, the result being that a large quantity of gas has been emitted, and has acted as a preventative against any further break in the floor. A borehole  $\frac{3}{4}$  in. diameter went to the depth of 74 ft.; at 51 ft. below the seam gas was given off strongly from 3 ft. of bind and a few inches of shale and coal. A pipe  $\frac{1}{4}$  in. diameter was fixed into the bore-hole, fitted with a gauge at the top; the pressure reached to 30 lbs. when the floor broke and the pressure went down. A gas meter was also fixed to the pipe; from this

the discharge was found to be 10½ cubic feet per hour. A 7-ft. length of pipe, made more secure, was then fitted with safety-valve and gauge. In Nov., 1870, the discharge was as above, the gauge indicated the pressure rising to 95 lbs., and from this time to June, 1873, the issue of gas has gone on increasingly. From July, 1874, to June, 1875, a daily register of the pressure of the issuing gas at this bore-hole was kept, showing the pressure ranging from 80 to 135 lbs. When the maximum pressure is gained a sudden fall takes place, the pressure rises again sometimes as quickly; this indicates that the gas at the extreme pressure finds a vent temporarily at some other point. It is probable this may be in the goaf, as no issue of gas has been seen at any part where the floor is open to observation.

In the year 1878 the total loss of life in coal mines and on the surface was 1375; of this the loss by explosions of fire-damp was 586, or 42 per cent. The loss of life from explosions in the same year in the mines of Durham, Northumberland, Cumberland, and Westmoreland was 5. In 1879 the total loss of life was 941; of which 184 were the result of explosions, or 19 per cent. The loss of life in Durham, Northumberland, Cumberland, and Westmoreland was only 1 in this year.

As the coal mines in Durham and Northumberland have for many years been remarkably free from explosions, it would be well to enquire into the cause of this exemption, whether the system of working, or ventilation, or the discipline in force in the mine conduces to give results so favourable in comparison with other districts where, probably, not more fire-damp is evolved from the coal. If any superiority in the system generally of carrying on the mines of Durham and Northumberland is found to exist it would be well if this could be imitated in other districts where the less favourable results (as to freedom from explosions and accidents generally) are being obtained.

M. E.

#### COLONEL SHAKESPEAR ON SAFETY-LAMPS.

SIR.—My lamp having been fully described in the Journal I need only ask you to name the following modification. Early in May last while on a visit to Mr. Parrington, the engineer of the Wearmouth Colliery, near Sunderland, we submitted a variety of lamps to the action of an artificial blower, and learnt the extreme danger of an exposed gauze. Then and there I substituted a metal cylinder with perfect success, and the lamp is now self-extinguishing, without fail, in two or three seconds. There are several other advantages in this plan.

J. D. SHAKESPEAR.

#### MINERS' PERMANENT RELIEF FUND.

SIR.—After the sad accident at Abercarn on Sept. 11, 1878, in which 258 lives were lost, the colliery proprietors of this district held a meeting at Cardiff on Sept. 20, and passed a resolution to the effect—“That it is most desirable to establish a general fund for the relief of all sufferers from colliery accidents in Monmouthshire and South Wales.” A committee was appointed by the colliers to consider the whole question; this they did, and a scheme was prepared and circulated, signed by Messrs. Abraham, Prosser, Davies, and Lewis. On Oct. 28 the same year a public meeting was held at the Town Hall, Cardiff, very ably presided over by Mr. J. T. D. Llewellyn, the high sheriff of the county. There was at that meeting every disposition shown by the landowners and others present to assist the employers and the employed in carrying out the schemes proposed by the committee, which was similar to one that had worked very satisfactorily in the North of England. It was also intimated by trustees of existing colliery accident funds that the balances in their hands, amounting to several thousand pounds, might very fairly and properly be handed over to the proposed Permanent Relief Fund. Unfortunately this scheme, launched under such favourable auspices, fell through owing, it was said, to the lack of cordial co-operation on the part of those most interested—the colliers and miners themselves.

I regret to say that when the Dinas accident occurred, only a few months later, on Jan. 13, 1879, in which 63 lives were lost, the public did not respond as was expected to the appeal then made, the attitude of the workmen having not unnaturally alienated to a great extent the sympathy of the public.

The fearful accident at Risca, which occurred on July 15, in which 120 lives have been lost, has again created very great sympathy; but the same difficulty is met with in very many cases by those soliciting subscriptions, as was the case in the Dinas accident; and many who can well afford to subscribe have declined to do so in consequence of the colliers having refused to take their part in carrying out the scheme suggested in 1878.

There is another view to take of this question, and which, I fear, is to a great extent lost sight of by the workmen. In the Government Inspector's returns it will be seen that collectively by far the greater number of lives are lost in what may be called the smaller accidents—that is, when only one, two, or three lives are sacrificed at one time. In these cases but little general sympathy is aroused, as they are not brought before the public, and consequently the same proportion of assistance is not received by the widows and children in these instances as in the others, although, no doubt, the distress and affliction caused will be the same. Surely this apparent injustice ought not to exist, and certainly would not exist if all cases were relieved from one general fund.

I wish particularly to address my remarks to the steam coal colliers of Monmouthshire and South Wales, and I cannot but think that they will, on mature reflection, take the advice given them by their own committee—men well able to give them valuable and sound advice on a subject with which they have made themselves familiar—and hesitate no longer to carry out in this district a similar scheme to the one adopted by the miners in the North of England. If the steam coal colliers will only take the initiative, I have no doubt but that the landlords and owners of collieries will do their part, and I am not without hope but that the public may also be induced to contribute to the fund; only it is of vital importance that those who are most interested in the scheme should not be slow to take action in the matter.

ALEX. BASSETT, M. Inst. C.E.

Tredegar Mineral Estate Office, Cardiff, July 26.

#### CANADIAN MINING NOTES.

SIR.—How difficult it is to get the people of England to turn their attention to Canada! Land in England is bought up by the rich, and the people have become too numerous for the soil. Land in Canada may be owned by any man. In England the people are the tillers of the soil and not the owners—in Canada hardly any person tills any soil that he does not own. In Ireland matters are worse! and England with her naval supremacy seeks assistance for her starving poor, within 24 hours ride of London, by the contributions of America! One would suppose these questions should influence the people and their rulers—that the new Government at least might see their way to cultivate the Queen's farm. What is the Queen's farm? and where is the Queen's farm?

The Queen's farm starts from the Red River of the north on the east, on the south the 49th parallel of north latitude, on the west the Rocky Mountains, and on the north as far as any person wants to go. The really fertile belt may be said to be 10° of latitude, or 600 miles. Thus we have a section of country full of all agricultural resources without people. In England you have people without land. Why not take the people of England, young and healthy and strong, who are circumscribed by rules and regulations, who have no land, and put them on the Queen's farm? But it will be asked, how are we to get there, we have no money to move? Money is in abundance to move grain or other crops, but there is no money to move people from the place of production to the place where they can be more prosperous and happy. In order to move people it is necessary to call in the assistance of the banks; in order to move people it is necessary to call in the assistance of the Government. Both the banks and the Government are the offshoot of the people, and without the people they could not exist and could not prosper. The propositions, then, that I lay down are—That it is the duty of the Government of England to assist her own people, and not be mean enough to let her subjects starve while she spends lots of money in nothing but foolery. That it is the duty of the people to demand their rights at the hands of the Government, and by every legitimate and lawful means endeavour to place themselves in circumstances of prosperity.

To a Canadian the matter appears perfectly simple. The Queen has a lot of subjects starving; the Queen has a farm which will support all her subjects that are starving and place them in prosperity. Why not place these starving subjects on the Queen's farm and give them a chance and let them acquire prosperity? How is this to be done? The Queen has well-educated men at the head of a department—call it, for example, the “Horse Guards.” Why not use the organisation and discipline which has been so effective in war—effective enough to make England what she is to-day, the strongest nation of the whole world—to carry out the idea? Why should not the Government pass an Act for the purpose of organising the Army of Peace, and with the men and the muscle and the discipline and the organisation past and present the Queen's farm would soon be peopled, and the loan of ten millions of pounds by the Imperial Government would be paid back to the Imperial Government in 20 years with full interest. Then the people of England would begin to recognise the value of the Queen's farm; then the Crown of England would add to itself another jewel gathered from Peace, and that jewel would be the fertile belt of the North American continent—full of peace, happiness, and prosperity.

BOURNONITE.

Brockville, Canada, July 13.

#### MINING IN CANADA—THE ACTON MINE.

SIR.—Being one of those unfortunates who purchased Canadian copper shares a few months back when they reached their highest—through the report of extraordinary discoveries in the Acton Mines—and as nearly four months have elapsed and no reports have since been published as to the progress made, or the amount of ore being raised, I should be extremely glad if any reader of the Journal can explain the reason that no reports are published either weekly or monthly in the *Mining Journal*. If the news is bad let us know the worst, if favourable so much the better—

ONE IN THE DARK.

#### MINING IN COLORADO.

SIR.—Some years ago, through the Journal, I called attention to the ill-considered investments made in Hall Valley, in this State, by the Hall Valley Silver Mining Company. Time has undoubtedly established as facts the observations I then made, which were founded on a personal knowledge of the subject. I now call the attention of your readers to the properties owned by the Geneva Consolidated Silver Mining Company, in Geneva Gulch, Clear Creek County, Colorado. After much work and outlay during the last three or four years this company is now possessed of some of the finest property in the State—Leadville not excepted. A tunnel has been driven about 1100 ft. in length, and has cut and disclosed ten or eleven lodes, which can now be worked to the greatest advantage by means of this tunnel, and can be made to yield a dividend-paying product; one of these lodes alone—the Baltic—can be made to yield enough to liquidate the company's indebtedness, and soon return a handsome dividend; and with such lodes as the Baltic, the Revenue, and others I could mention, why should our English companies be continually shipping money to this country to operate and develop them? With practical economical management expected results might be reached, and without this disappointment can only follow. It is not only in the interests of the company but of Colorado that the best possible output should be made, and that investors in mines receive their just expectations.

DANIEL ROBERTS.

Georgetown, July 11.

#### THE LEAD TRADE.

SIR.—Since writing to you the market has again taken a much firmer tone, and the following sales have been made:—  
16th inst.—250 tons first fusion Spanish, at 157. 5s.  
21st inst.—50 tons Yorkshire soft lead, at 157. 10s.  
22nd inst.—100 tons of Haydon Bridge lead, at 157. 12s. 6d.  
26th inst.—150 tons of soft English, at 157. 15s.; 75 tons made from W.B. ores, at 161.; 100 tons Spanish lead-silver, secret terms, and lead ore in good demand and advancing.

STOCKS.

July 27.

#### WYNNSTAY CASTLE SLATE AND SLAB QUARRY.

SIR.—In perusing the Journal of July 10 I notice among others that the above quarry has been registered, and is now to be worked by a limited liability company, a party of influential London capitalists having recently taken it up for that purpose, and no doubt they are become possessed of a very valuable property; valuable not only for its inexhaustible bed of slate but also for the cheap and expeditious way its situation affords for not only its development but its close proximity to the railroad which I believe is their north-eastern boundary, where they have ample space of ground for wharfage, and the produce of the quarry loaded therefrom into the railway company's trucks for conveyance to any part of the United Kingdom with which it has direct communication. This is a boon but seldom met with in slate quarry enterprises, and cannot be over-estimated. It is a well-known fact that many slate quarries situate in remote districts of the Principality have been crushed to the death by the enormous cost attending the construction of roads and rail and laying the same. I know of some where from 50,000l. to 75,000l. has been expended for that purpose by one quarry alone; but the situation of this property renders it inexpedient for the directors to spend above a mere trifle of their capital for that purpose, as they have only to construct an incline of not more than 300 yards from the centre of their works to go alongside the railway; and in view of this it strikes me rather forcibly that even the debris, or waste rock, could be made a source of revenue to the quarry company by supplying it to the railway company for the purpose of ballasting their permanent way, the purchase of additional land at central stations, and the labour cost for getting the same is no doubt a large item in the railway companies' expenditure column. Within the space of its own grant there is ample room to deposit waste for ages without encroaching on the vein of slate, and also an ample supply of water available for all the purposes of an extensive sawing, planing, and enamelling establishment, and unless this quarry is heavily weighted with promotion money, the fixed capital of the company will be found more than sufficient if energetically and economically applied to bring the property into thorough working order, and a profitable concern the result. I have no hesitation in stating that success is inevitable here, and I believe that opinion is shared in by highly respectable quarry managers and engineers who have had a long and varied experience with the different slate districts of North and South Wales. Its situation being about midway between the two villages, it will be the means of giving active employment near their homes to the population, who mostly are engaged in quarrying and mining pursuits. Both the company and they are to be congratulated on this, as it will be a great mutual advantage; and for the company to be able to command a lot of sober and industrious workmen with cottages in the immediate district of the quarry, they will not have to go to other districts and import strangers, who prove as a rule the means of sowing dissension between master and man; and I have no doubt there will be also many local holders of shares, and it would be well if the directors would take time by the forelock and purchase a sufficient quantity of rails, timber, and machinery. All those items can be procured for at least 100 per cent. less now than they could be some years ago; and as history repeats itself, there cannot be the least measure of doubt but that a reaction will set in, and that before very long, so they better prepare for that welcome change, and as so much preliminary work has already been done there by the former holders, but a short time need elapse before it can be brought into full working order and its capabilities proved, and the produce in the shape of slates, slabs, and enamelled goods, be put in the market.

At a recent Eisteddfod held at Llanbrynmair, a magnificent enamelled table, manufactured from the rock of this quarry, was presented to Sir W. W. Wynn, one of the presidents of the day, which as a work of art was greatly admired by the thousands who flocked to see it. Competent judges say that the rock in this quarry is well adapted for this kind of work, the trade in which is becoming more extensive daily, and the demand at present much in excess of the supply. In conclusion, I trust the action of the directors of this quarry will be one of energy and economy, which are the only ex-



pedients needful to make this property a source of great profit to those that invest in it, and to the good of the district at large.

INVESTOR.

## GOLD IN WALES—No. XXVI.

THE MAWDDACH VALLEY, MERIONETH—(SWITZERLAND AT HOME).  
[Concluded from last week's Journal.]

SIR.—The metallic sulphides themselves (excepting copper and lead ores) have hitherto proved almost commercially valueless, owing to the fact that buyers of mixed ores such as these have not been found who will compensate sellers for the precious metals which the ores may happen to contain. It is a fact within my own knowledge that 20 tons or more of poor copper ore from a mine of this district was sold to smelters at St. Helens at the current rate per unit for 34 produce, which, judging from what I extracted myself from about 3 cwt. of the "leavings," must have contained several thousand ounces of gold. A measure of appreciation for this "very pretty lot of ore" was duly exhibited by the said smelters in the offer of 5s. a ton advance on the price for "as much more as could be raised."

Hitherto here, as elsewhere, attempts to work auriferous sulphides, arsenides, antimonides, tellurides, &c., by the ordinary amalgamation process have resulted in the loss of nearly one-half of the contained gold and silver, and entailed a very serious loss of quicksilver as well; and here (so far as Merionethshire is concerned) the question has quietly rested for several years; and, probably, nobody will again attempt the amalgamation of sulphides for their contained gold.

By the ordinary methods of amalgamation it is stated as fact that the loss of gold at the St. John del Rey Mine is 30 per cent; in the Brazils, generally, 30 per cent; at Zell, 35 to 40 per cent; in Hungary and the Tyrol, 50 per cent; in Chili, 66 per cent; at Vallangasca (Piedmont), 87 per cent; and that in some cases the loss of quicksilver is even much more serious than that of gold.

Appended is a list of experimental and working results of the gold yield of this district, of the general accuracy of which there is little doubt. I have selected only 20 localities out of more than twice that number, and have noted them from 1 to 20. To these localities are referred nearly 600 assays, and more or less large trials of lodestuff, and some really large operations on hundreds of tons. Most of the 283 experimental trials referred to as of No. 20 locality were undertaken upon 60 tons of lodestuff raised for the purpose of special testing by analysis and in actual work. The prominent aim being to ascertain, if possible, the maximum quantity of the lodestuff that was comparatively worthless, so that it might be at once thrown aside, and all thought centred on the remainder of the minerals, if by repeated experiment the game was found "worth the candle." Although some of these analytical results are really very extraordinary, *per se*, they must be taken to be of no value whatever as representing working averages. They are introduced with no such misleading intention. But, on the other hand, there is a real importance attaching to the result, which (so far as my long experience goes) no other series of trials has ever yet attained to. They are of great significance, inasmuch as the new fact has been elicited that the lodestuff poorest in metallic minerals (on an adequate scale) can be profitably operated on by an improved method of amalgamation, at a cost of about 20 to 24 grains of gold to the ton. The 23 amalgamation trials (of 20 localities) most satisfactorily prove this. Running this unmistakable fact alongside the reported gold yield from poor stuff at localities 16 and 18, makes the fact of still greater significance.

Further than this, the results show, for the first time in the history of Welsh gold, that the mixed sulphides (in some of the localities) are rich enough in the precious metals to pay a large profit by appropriate smelting and chemical processes.

In the full consideration of this interesting and I think important question it must be borne in mind that it is simply impossible to sample such lodestuff for its contained gold and silver, because there exist in it variable quantities of these precious metals in a free state (often impalpable to the verge of the infinitely little), as well as in sundry states of combination, &c. To fairly sample the lodestuff, therefore, presupposes the particles of gold and silver to be of equal size and weight, and, what is more, to be equidistant, which are artificial conditions that can never be arranged by sampling after the methods adopted with copper and other ores containing either few or many units of the severally contained metals.

Fair sampling the lodestuff for gold being thus thrust out of the question, it may be inferred that it is impossible to estimate with anything like an approach to accuracy the values in bulk of such ever-varying minerals for the gold and silver, which by comparison generally occur free, associated, or secreted, in very minute particles, and never equally disseminated throughout the lodestuff.

Behind this damaging fact to the mineowners, smelters as a rule safely entrench themselves when sellers offer such ores, and allow little or nothing (generally the latter) for the precious metals known to be contained in them. Example in copper produce sold from locality No. 6 in the appendix.

Obviously these assay experiments, and some of the others, are of the greatest practical use, for by their aid it can be determined where the precious metals occur in profitable quantities; and how selections of the mixed minerals can be made for distinctive reduction operations, &c. In fact, assaying is indispensable, and a great number of assays must be made in order to work with the greatest possible certainty of favourable results. One practical way of estimating whether such minerals can be wrought at a profit (under circumstances such as stated) is to ascertain first the cost of raising and reducing them.

By the new methods of operation employed on the 60 tons referred to the maximum cost was 60*l*. To cover this cost, therefore, requires a minimum yield of 1½ ton of pig-lead, 80 oz. of silver, and 7 oz. of gold, without including any other resulting products whatever. I think the minimum value of the ore in bulk may be taken at 40*s*. per ton.

Omitting from the estimate the occasional, and it may be infrequent, occurrence of the rich silver ore (polytellite), and excluding all the chances of finding virgin gold of considerable value, at times to lift results far over any datum line that may be called an average. The minimum value of the ores in bulk which I have just given is below the true commercial value of the metals, &c., contained in the minerals. In part proof of this, 1 ton of the mixed sulphides, indiscriminately taken, and operated upon by one of the new processes of furnace treatment, &c., gave resulting metals of the baser sort, sufficient of themselves to pay all costs of reduction, and they holding at the rate of 200 oz. of silver and 12½ oz. of gold to 1 ton of metals. The results by assays of the tailings concentrated after the 23 amalgamation trials of locality 20, are particularly referred to as being in my opinion of vast importance to private owners of auriferous sulphides, &c., whether at home or abroad, particularly if metal growth re-creation be fairly taken into the account.

I finished my last communication with the following remark of "Roberts, Miner," who has since died—"There's somebody's wealth in that mountain." This is quite true, and I hope the somebody will soon step forward to put it into a form that the Master of the Mint can make right royal use of it.

In closing this communication allow me to reiterate what I publicly declared 20 years ago—namely, "I beg distinctly to state that I do not think the average yield of gold in the Dolgelly district will exceed ½ oz. to the ton, although there are several extraordinary exceptions to the rule in some of the quartz lodes of the district." This opinion still clings to me. But what of it? It compares favourably with some recently published Australian results. In April last the Port Phillip and Colonial Gold Company's yield was at the rate of 6 dwts. 17½ grs. to the ton of quartz; and the Victoria (London) Mining Company, for the same month, 5 dwts. 18 grs. to the ton. The results in the appendix clearly point to probable reward in associated effort touching the future of the precious metals of the "Royal Mines" of the county Merioneth.

Some of the causes of failure in mining for the precious metals are not far to seek. They may be taken somewhat in the following order:—Smallness of some of the mineral veins. Non-examination of the minerals by skilful assaying. Misrepresentation of analytical results. "Salting" the minerals. Ignorance of mining opera-

tions, lack of skill, and want of will. The mining practice pursued for the most part erroneous. Incompetence of agents, managers, and directors. Rash expenditure in the purchase of mining rights, &c. Insufficient working capital at outset. Rash expenditure in the erection of costly machinery, &c. Inappropriate, or inadequate, machinery and appliances. Putting good machinery in the wrong locality. Putting up useless apparatus, knowing it to be such. Neglect of contract and tribute systems. Want of labour-saving appliances, such as the rock-drill. Persistence in working low-grade quartz and ores. The general disregard of mixed sulphides. The almost total disregard of the loss of quicksilver. Derangements by arsenides, &c. Disregard of the fact that gold in quartz, &c., is sometimes so exceedingly fine that it requires to be ground as well as crushed. The total neglect of tailings after amalgamation. The disregard of the waste of gold in the tailings. The hasty looking out for premiums on shares. Sometimes the hasty, inconsiderate, and dishonest declaration of dividends.

But it has been truly said "The history of failures is the history of success." The shoals and quicksands have been clearly mapped out, and they may, therefore, be avoided in the future. Taken as a whole there has been no failure whatever, or anything like it in the Dolgelly district. To my knowledge the acquired gold upon which royalty has actually been paid was in value more than treble all the legitimate mining costs of the last 25 years put together. Finally, I assert confidently that the circumstances of Welsh gold are under control, and that the lodestuff generally is remuneratively auriferous.

## APPENDIX.

## List of Experimental and Working Results in 20 Localities (Merioneth).

- 1.—5 assays averaged 3 ozs. 18 dwts. of gold to the ton of lode stuff.
- 2.—1 assay gave at the rate of 4 ozs. of gold to the ton of lode stuff.
- 3.—On reduction by amalgamation 244 lbs. of lode stuff yielded 8½ ozs.; 6 cwt., 17 ozs.; 298 tons of refuse, 17½ ozs. of gold.
- 4.—½ ton yielded ¾ oz. gold.
- 5.—On reduction by amalgamation 14 lbs. gave at the rate of 168 ozs.; 2 cwt., 5½ ozs.; and 5 cwt., ¾ oz. gold to the ton.
- 6.—4 parcels of 49, 49, 50, and 35 tons copper pyrites gave severally—1 oz., 1½ oz., 1 oz., and ¾ oz. of gold to the ton, besides silver, by buyers' assays. About 9000*l*. worth of this ore was sold to the smelters without consideration for the contained and acknowledged precious metals.
- 7.—17 assays averaged 1 oz. 10½ dwts. gold.
- 15 assays of galena averaged 25½ ozs. silver to the ton.
- 8.—A long series of assays gave 5 to 7 dwts.; another long series, 8 to 17 dwts. gold to the ton.
- 9.—A series of 42 assays (on 35 tons) averaged 3 ozs. 0 dwts. 18 grs. Another series of 6 assays averaged 2 ozs. 17 dwts. 9 grs. gold.
- 10.—10 assays of galena ranged from 17 grs. to 4½ dwts.—9 assays of galena ranged from 41 grs. to 12 dwts. gold, 44 ozs. silver, and 80 per cent. lead.
- 11.—On reduction by amalgamation 5 cwt. yielded 18 dwts. gold.
- 12.—2 assays averaged 153 ozs. gold to the ton.
- 13.—A series of assays of galena ranged from 5 to 11 dwts. gold and 4½ ozs. silver to the ton.
- 14.—On reduction by amalgamation 1 cwt. yielded of gold 18 ozs.; 4½ cwt., 66 ozs.; 1 ton, 35½ ozs.; 400 tons, 280 ozs.; 970½ tons, 478½ ozs.; and 1593 tons (poorest stuff), 562½ ozs.
- 15.—8 assays averaged of gold 19 ozs.; 7 assays, 68½ ozs.; 11 assays, 91 ozs. One assay gave at the rate of 2½ per cent. gold. Seven trials by amalgamation (2077 lbs.) averaged 11½ ozs. to the ton. One assay of the tailings of the 7 amalgamation trials, 8½ dwts. to the ton. On reduction by amalgamation yield of gold from 1 lb. ore 9 ozs.; 2 lbs., 6½ ozs.; 22 tons, 13½ oz.; 100 tons, 34½ ozs.; 311 tons, 117½ ozs.
- 16.—On reduction by amalgamation about 4000 tons of quartz yielded nearly 2000 ozs. of gold; 1000 tons of it gave 606 ozs.
- 17.—A series of assays and small trials by amalgamation gave very large results, which were not publicly stated.
- 18.—On reduction by amalgamation of picked mineral, aggregates selected at different periods, yielded of gold worth 3*l*. 17*s*. 6*d*. per oz. from 3 tons, 976 ozs.; 6½ tons, 2303 ozs.; 13½ tons, 4566 ozs.; 19 tons, 6718 ozs.; 39 tons 9 cwt., 9363½ ozs.; at 2310 tons 17 cwt., 10,911 ozs.; at 4154 tons, 11,508 ozs.; at 5063 tons, 11,663 ozs. Average yield 2 ozs. 6 dwts. to the ton of mineral operated on. 350 fms. gave 3500 tons of lode stuff—1 cubic fathom of which gave 784 ozs. gold. Fifty fathoms of one narrow lode, by 30 fms. deep, yielded 11,508 ozs. worth nearly 45,000*l*. It should be stated that 2500 tons of poor ore gave at the rate of ¾ oz. gold to the ton, and 1036 tons of the poorest refuse yielded ½ oz. to the ton.
- 19.—A series of 35 assays and larger experiments on mixed sulphides gave an average of 4 ozs. 1 dwt. to the ton. The following 13 assays for gold and silver are from headings which contained visible gold:—

56 lbs. ore ... Silver, ozs.	55-89 ... Gold, ozs.	111-79 to ton.
28 "	47-00	64-00 "
16 "	125-50	220-00 "
12 "	40-30	82-60 "
105 "	11-33	52-67 "
11 "	161-33	382-67 "
15 "	114-66	289-34 "
14 "	96-66	223-00 "
15 "	90-66	181-34 "
36 "	86-66	185-34 "
85 "	17-33	94-67 "
19 "	37-00	42-00 "

300 tons of this ore were dressed down to 10½ tons, and yielded 176 ozs. gold, nearly 1½ ozs. to the ton, and this independently of 75 lbs. weight of rich specimens given away by the then proprietor. Another series of 14 assays of tailings averaged 22 ozs. gold to the ton. A series of 43 trials of mixed sulphides by very imperfect amalgamation (in all 27½ tons) yielded 8 ozs. 6 dwts. gold, which is about 6 dwts. to the ton. Some dry slimes yielded at the rate of 255 and 261 ozs. gold to the ton. Dressed galena as much as 227 and 303 ozs.

20.—ASSAYS: One assay of copper pyrites gave at the rate of 4½ ozs. silver, and 6 assays 8½ ozs. gold to the ton; 1 assay (chiefly copper pyrites), 9 ozs. silver; 36 assays of galena from various places averaged 60 per cent. lead; 19 assays of galena (raw) averaged 69 ozs. silver; 4 of ditto averaged 3 ozs. gold; 1 assay of galena gave 278 ozs. silver and 2 ozs. gold; 20 assays of galena (dressed) averaged 4½ ozs. silver (most of the silver being in a free state had washed away in the operation of dressing); 12 assays of the same dressed galena, 6½ ozs. gold; 7 assays of lead slimes averaged 85½ ozs. silver, 2 assays of ditto averaged 240 ozs. silver, and 2 others of ditto 108 ozs. gold; 2 assays of refuse washed averaged 8 ozs. silver, and 1 assay of the same gave at the rate of 10½ ozs. gold; 2 assays of auriferous quartz and galena averaged 8 ozs. silver and 5½ ozs. gold; 2 assays of galena and iron pyrites averaged 29 ozs. silver, and 2 others of ditto ½ oz. gold; 5 assays of ordinary blende averaged 14½ ozs. silver, and 3 others 13½ ozs. gold; 3 assays blende (holding probably polytellite) averaged 1002½ ozs. auriferous silver; 3 assays of same 13 ozs. gold; 6 assays of blende and galena averaged 25½ ozs. silver; 5 assays of same 1½ oz. gold; 1 assay of blende, &c., gave 597 ozs. auriferous silver, another of same 2389 ozs.; 1 assay of marcasite gave 4½ ozs. silver, another ½ oz. gold; 2 assays of black shales (the enclosing rock of a lode) averaged ½ oz. silver, and 9 assays of same 4½ ozs. of argentiferous gold; 4 assays of a mixed mineral, selected specially, averaged 37½ ozs. silver, and 3 assays of same 18½ ozs. gold; 6 assays of another selected mixed mineral averaged 51½ ozs. silver, and 8 assays of same averaged 6½ ozs. gold; 16 large meltings of same gave at the rate of 882 lbs. weight of metallic alloy, very highly argentiferous and auriferous; 5 assays of mixed sulphides averaged 384 ozs. silver; 1 assay of same 3½ ozs. gold; 1 assay of iron pyrites gave 74 ozs. silver; 5 assays of same averaged 2½ ozs. gold; 3 assays of polytellite gave at the rate of 3528 ozs. silver each, another of same 278 ozs. silver, another 2009 ozs. silver, another 707 ozs. silver; 8 assays of polytellite (with metallic admixtures) averaged 1740 ozs. silver; 2 assays of same averaged 1½ oz. gold; 2 assays of odds and ends of minerals (picked), 24½ ozs. gold; a grey ore 16½ ozs. silver; 1 large assay of quartz (gold visible), 4½ ozs. gold; 1 assay of a proustite-looking mineral gave at the rate of 56 ozs. gold; 23 amalgamation trials

of quantities ranging from 14 lbs. to 5 tons, and consisting chiefly of quartz and hornstone averaged 103½ grs. gold to the ton of mineral; 12 assays of tailings of the last-named 23 amalgamation trials averaged 10 ozs. silver; 16 assays of same averaged 16½ ozs. gold; 2 assays of the buddle stuff from these trials gave at the rate of 9½ ozs. gold to the ton. After smelting a ton of the mixed sulphides, &c., by a new method 12 assays of the resulting pig-lead and metallic alloys averaged 108½ ozs. silver, and 6 assays of same 15½ ozs. gold to the ton.  
London, July 12. T. A. READWIN, F.G.S., &c.

## LORD'S DUES.

SIR.—In the early days of mining the lords of the land in the counties of Devon and Cornwall were so averse to having their land defaced by mining operations that in order to enable miners to enter upon their lands an Act of Parliament was passed, called the Statutory Act, under which they had power to work within certain limits. The limits were called tin bounds, which were held to exist so long as they were annually renewed at the corners and working continued, but if the works were suspended for a period of twelve months, and no dues paid to the lord, the right to work lapsed. The dues, or royalty, were 1-13th. Many persons have erred in supposing that the renewal annually kept the right line whether working was continued or not. It was not so; continual working was necessary for continued right.

In modern times the owners of land, with few exceptions, are too sensible of the importance of mining to their own interest to withhold liberty to search for metallic and other minerals, but the question of dues has been in an unsatisfactory state—the lords sometimes insisting on too much, and the miners desiring to pay, perhaps, too little. The lords having the power to refuse the grant the workers must submit to their terms or keep away. Hence it happens that in some cases dues as high as one-eighth of all the produce has been paid (in Wales for instance). Some lords are more generous than others, and from a desire to have their lands developed for their own advantage and that of the miners they grant mining leases on more easy terms—1-24th dues, &c. Dues must always remain a question of arrangement between the grantor and grantee; the lord may refuse to grant on reasonable terms, and the miner may decline to accept a grant. The hardest lords that I know are those of china-clay lands, where the dues are so high in some cases as 4*s*. per ton—i.e., about one-fifth of all the value of the produce. Of course the proportion paid to the lords of clay land should be higher than those paid in metallic mines—the risk being less. In the early days of clay working the dues were only about 1*s*. per ton, which were certainly very low, I think 2*s*. 6*d*. per ton a fairer proportion for the lords of china-clay.

Within the last few days, at mine meetings and elsewhere, some rather severe remarks were made because Mr. Basset expressed a wish to receive the 1-13th dues secured by his lease to Dolcoath adventurers, Mr. Basset having during the late time of depression kindly accepted 1-20th. I cannot perceive anything unreasonable in Mr. Basset's request, the lessees having accepted the lease, and thereby undertook to pay 1-13th of the returns as dues; but I admit that the dues ought not to have been fixed at such a figure, 1-20th being a fair proportion. Miners are so eager to get possession, or to retain possession, of mineral lands that they accept leases on almost any terms, and afterwards trust to the liberality of the lords, and to call them illiberal if they insist on the fulfilment of the conditions of the leases.

I think that it is high time that a reformation should take place in the conditions under which mining leases have been granted, those conditions being absurd—1. The expense of the "deed" should be reduced from 25 or 30 guineas to 10 guineas.—2. The minimum rent should be less, if any.—3. The land destroyed should be paid for according to a valuation, and not at 100*l*. or 150*l*. per acre, when it is not worth 40*l*., and in some cases not 20*l*. per acre.—4. The account-house and other houses erected by the lessees should be theirs for a term of years, and not the lessors, on the relinquishment of the mine.—5. The dues should be on profits only, but the lords' proportion of the profits should, of course, be much higher than 1-20th—say, ½ or 1-10th of the clear profit. I think that your readers will agree with me that those suggestions are agreeable to reason and common sense, but their adoption will be difficult while selfishness is so predominant.  
Truro, July 28. R. SYMONS.

## START IN MINING.

SIR.—When miners who take contracts to raise metallic minerals at so much in 1*l*., usually called "tribute," are successful therein by meeting with a rich deposit of ore, they call it a "sturt" (start). Some miners have gained a small fortune in two months in that way. I remember that a miner called B. Spargo, of Gwennap, gained 1300*l*. in two months in the United Mines. The late Capt. Tonkin, of Carharrack, earned 500*l*. in six months; the late Capt. Whitburne 400*l*. in the same period. I remember also that the late Capt. Josiah Vivian, of North Roskear told me of a miner who earned 1000*l*. in a brief period, which he spent in drink in a short time; and, singular as it may appear, he told Capt. V. that if he had another 1000*l*. he would do the same with it! Fortunes quickly acquired "take to themselves wings and fly away." R. SYMONS.  
Truro, July 29.

## TREVINC CONSOLS.

SIR.—In my last letter, under the head of "Another Glance at Gwennap," I mentioned Trevinc Consols as a mine deserving of particular mention, and, therefore, after making minute inquiries from the miners, and observations, I subjoin the result.

If the character of a man is known by the company he keeps so is that of a mine by its contiguity to other mines. Of Trevinc Consols I may say that it has had very rich neighbours, which reflect a value on it. On the eastern side is Clifford Amalgamated, which yielded about 1,000,000*l*. profit. On the immediate north-west is Wheal Squire, which yielded large profits about 60 or 70 years ago, and adjacent to this is Tingtans, now idle, but formerly profitable. Adjoining that is Wheal Damsel, which yielded 200,000*l*. profit to Messrs. Williams and Co., and Wheal Jewell, which yielded 300,000*l*. profit to the same company. These mines are within a short distance from Trevinc Consols. At the west are Tresavean, which yielded 500,000*l*. profit, and other rich mines—Trethellan, Treviskey, Brewer, and Penstruthal.

Trevinc Consols is partly in Trevinc estate, and partly in the manor of Cosgarne, in Gwennap, and is held under leases for 21 years, at low royalties. The manager is Capt. J. Mayne, of St. Day, who is recognised as a very intelligent practical miner. The secretary is Mr. J. A. Dobson, 88, Bishopsgate-street Within, London. The number of shares is 12,000. It is supposed that the amount called up (3000*l*.) will meet the cost of working till the returns balance the expenditure, and that soon afterwards the executive will be enabled to declare dividends out of profits, of which no doubt is entertained.

The rock containing the lodes is clay-slate, in the vicinity of the Carnmarth granite, all the mines surrounding which have been rich; so from analogy I deduce the conclusion that Trevinc Consols will be no exception when developed. At present the mine is only merging from virginity. The lodes (six in number) are well defined. The engine-shaft is 15 fathoms deep, north of which at that level is a copper lode yielding 2 tons of copper ore per fathom, some of which is to be seen at surface. The miners attach a high estimate on this lode, believing that a large rich deposit of ore is beneath. The engine is in course of erection.

About 60 fathoms west of the engine-shaft, in a shaft 5 fathoms deep, another lode has been struck; it is 2 ft. wide, and containing copper ore, which can be worked at 6*s*. 8*d*. in 1*l*. The miners have a high opinion of this lode also, believing that a great mass of copper is in proximity. The other four lodes have been laid open sufficiently to justify the miners' good opinion of them. The sett is large, being about 270 fathoms square, and is intersected by a cross-course and an elvan course.

It is decidedly better to lay out a small capital in developing a maiden piece of mineral ground like this than expending it in deep exhausted mines. The fact that such respectable and intelligent agents as Capt. John Maynard, of East Pool, and Capt. White, of



Wheal Peavor, have reported very highly on this property, after a careful examination, should be sufficient to inspire the utmost confidence in success as the result of the working, and to induce the purchase of shares, if any are to be had.

I have not seen Capt. Mayne on the subject of this letter, but I suppose that he will read it in the *Mining Journal*, and not disapprove of it. I am glad that he has hit upon such a promising sett, and I wish him, and all other honest workers, success in his and their legitimate undertakings.—*Truro, July 29.* R. SYMONS.

#### EAST DEVON CONSOLS.

SIR,—During my visit in this neighbourhood my attention has been attracted by the striking character of a mine lately commenced working which adjoins the South Devon United Copper Mines. The sett is extensive and its situation most favourable for the production of large masses of mineral. It is bounded on the west by the South Devon and is of the same geological composition, the lodes from which vast quantities of ore have and are still being taken. The same lodes are passing through the entire length of the mine—East Devon Consols. The strata in which the lodes are imbedded are killas, carrying a large beautiful gossan, not far distant from the junction of granite. It has been highly reported on by the following eminent and practical mining authorities:—Capt. Richards, of Devon Great Consols; Capt. Browning and Rosewarne, and other practical men of acknowledged authority. I have been connected with mining for nearly forty years, and confess that I know no concern with better prospects of success than this mine, which is well situated in virgin ground.—*Taristock, July 28.* WILLIAM THOMAS.

#### WEST VOR MINE.

SIR,—My attention has been strongly attracted by the striking character of a mine lately commenced working, which adjoins Great Wheal Vor, and is now known as West Vor. The sett is extensive, and its situation is most favourable for the production of large masses of tin, it being bounded on the east by Great Vor Mine, and being of the same geological composition, the lodes from which such vast returns were made passing through the entire length of the mine. Capt. Josiah Thomas, of Dolcoath, in a report on West Vor states that Great Vor, late Old Vor, was probably one of the most productive tin mines ever found in Cornwall. On the north it is bounded by Great Work, also one of the most successful of our Cornish tin mines, and to add to its chances of success is the junction of killas and granite which occurs in the sett. It has been highly reported on by the following eminent and practical mining authorities:—Capt. Josiah Thomas, manager of Dolcoath Mine; Capt. S. Harris, manager of Great Vor Mine; Capt. W. R. Rutter, manager of West Seton; and other practical men of acknowledged authority. These reports can be had on application to Mr. T. Hunter, the secretary, 12, Union-court, Old Broad-street.—*London, July 30.* JOS. J. REYNOLDS.

#### CORNISH MINING—THE GWENNAP DISTRICT, AND ITS UNWROUGHT GROUND.

SIR,—Carn Marth Granite Hill is to the mines of Gwennap what Carn Brea is to the productive run of mines in the Camborne and Illogan districts. It has been remarked by almost every writer on the subject that by far the larger part of the mineral wealth of Cornwall occurs within a distance of two or three miles on either side of the line of junction between the granite and slate; this is unquestionably true, yet no part of the line itself seems to have been more productive than any other spot of equal extent within the distance already mentioned. In confirmation of this take from the western part of Dolcoath Mine to the eastern end of Carn Brea, a distance of about three miles, it is difficult to say what portion of this ground has been and is the most productive. The same remark applies to the south side of Carn Brea hill, from South Cundarrow to Wheal Buller, about the same distance, there is almost a uniformity of riches throughout the whole length, some deposits probably being deeper than others. Within my recollection it was said that mineral in paying quantities would not be found in this tract of ground, but many have lived to prove the fallacy of it. I am somewhat led to remark on this from a letter which recently appeared in your valuable Journal, the substance of which was that the Gwennap district was almost exhausted. Starting from the foot of Carn Marth range of granite on a line west through unwrought ground may be seen elvans of a highly crystalline nature in close connection with copper lodes, the backs of which contain gossan equal in quality and closely resembling the ferruginous masses found in the Gwennap Great Consols and United Mines. I contend it is idle to presume this ground is unproductive, such gossan backs have always proved sure precursors of mineral wealth (Devon Great Consols to wit); indeed, I never knew a true copper gossan fail turning out large quantities of mineral in depth. The piece of ground alluded to embraces within its limits the Wheal Buller and Penstruthal lodes, which traverse the sett of East Wheal Buller, where a cross-cut is being put out south at the 40 fm. level for their intersection. At this depth the whole district commenced ore producing, proving more and more valuable on depth being attained, and analogy points to similar results on cutting the lodes in East Wheal Buller; they proved rich to the east as well as west of it. Probably the discovery of tin recently made in Mount Carbis Mine about 30 fms. deep on the western slope of the same hill in virgin ground will be another proof of the vast riches which abound in the unwrought ground of the district. It appears to be on the line of South Frances and West Basset lodes, which are now among the richest tin producing mines of the county, and I venture to predict it is the outcrop of what will lead to the opening up of as rich and lasting tin mine as any on either side of Carn Brea Hill. New Cathedral on the north-east slope of Carn Marth is another piece of new ground, the indications at the present shallow workings being sufficient to convince the most sceptical that a little more depth only is required to open a valuable copper mine. CHARLES BAWDEN, *St. Day, Scorrier, Cornwall, July 28.*

#### LISKEARD DISTRICT.

SIR,—The undermentioned extract from the 5s. (1865) edition of "Mines of Cornwall," by Thomas Spargo, of Gresham House, may be of some interest possibly to your correspondent, "A Shareholder," in last Saturday's Journal, although doubtless in the period elapsed since this was written some if not many changes have occurred both in the local management, working expenses, position of working, condition of mineral ground, and so on, but it may serve to cheer up shareholders who may have become fainthearted at calls being made, and who have either sold out or contemplate doing so, of the East Caradon. The present manager is reputed to be a good practical miner, and a fair successor to any who have preceded him. Whether they are working in another part of the sett to that which they were working in 1864 I do not know, but there seems to be favourable signs of another turn of luck, and it may come sooner than many expect. But for the outlay requisite one would be disposed to recommend boring machines and the use of some of the recently invented explosive mediums rather than the old-fashioned plan, which cannot but be slow, taking into consideration the hard nature of the country to drive or sink through. A new edition of the above-mentioned work by Mr. T. Spargo or some other equally competent mining man would doubtless be much appreciated, and I hope that someone with the special knowledge will publish one:—

This is one of those mines in which it is not difficult to see how the profits are obtained. The circular lode produces in places deposits of ore worth from 40% to 60% per fathom, and as most of the mining ground of the world can be stopped away in the lodes for 25 to 50 per fathom, it is plain to see how the margin of from 35% to 55% per fathom gain on the working goes to form large profits. The sales from the mine frequently amount to 3000% per month, while the cost is barely 1000%, showing a rich lode, a good mine, and good management. The boundaries eastward, the great bases of these productive copper lodes, remain intact, and will continue no doubt to make thousands of pounds profits as the resources of the mine are followed downward. The depth is nothing, and will not be considerable or offer much difficulty as to the working for the next 20 years, while the profits have already been from 70,000% to 80,000% upon an outlay of 20,000%, the selling value being 90,000%. The mine has made occasionally 2000% a month dividends, or more than cent. per cent. upon the whole outlay. It is not easy to imagine how the most sanguine financier can expect a better result. The adit was 20 fms.; depth below 90 fms.; dues 1-18th; rocks granite, clay-

slate, and elvan; shares in number as now, secretary also; then the manager was Capt. James Secombe. The sales of copper were as follows:—In 1862, 5265 tons for 35,600% 3s. 6d.; in 1863, 6031 tons for 34,155% 19s. 3d.; and in 1864, 6406 tons for 35,482% 13s. 7d. There were 250 persons employed.

The last report, dated July 13, from the local manager reads hopefully, although perhaps not so highly coloured as those by some other parties that have appeared in the Journal; but I confess I would have in preference a moderate report than one somewhat painted up, and made (I am disposed to think) to serve the purpose of share speculators rather than of investors, and no doubt some have been misled thereby into purchasing at the lately comparatively high prices. I should certainly like to see (if the agent will send them) reports to the Journal more often than is the case. This latter remark would also apply to the case of the West Mary Ann, a continuation of (I believe) Wheal Mary Ann, and I presume of that Trelawny Mine, about which so much has been printed of late. It would no doubt be interesting to some of your readers to have a regular report of what is being done at West Mary Ann; they cut a lode some time ago, and it is to be hoped that they are sinking or driving on it with advantage. The capital is small, but I believe it is well held by local shareholders chiefly.—*July 26.* COPPER ORE.

#### OLD GUNNISLAKE MINE.

SIR,—As I understand there is to be no report in the Journal of this week, may I ask the cause? It cannot be that there is nothing interesting to the adventurers to be made known, as a fully attended meeting of the committee was held a few days ago to determine upon which of the numerous offers to supply the mine with an engine for the purpose of working a boring should be accepted, and, after two hours deliberation, one was fixed upon and ordered, subject to the approval of the engineer of the mine. Great progress has been made with the squaring down and completing the level for the reception of the boring-machine, but upon this matter it is not determined whether to purchase one or let the driving of level to those who are in the habit of taking such a bargain. An assay has also been taken of the ore coming from the end of the lode in the level, and found to contain 19½ per cent. of copper. WM. EDISTON, *Taristock, July 29.*

#### MINING IN LLANARMON.

SIR,—The numerous discoveries of lead ore now being made in this district all tend to show what might be accomplished if only a sufficient amount of capital is brought to bear in developing the known rich lodes in a similar carboniferous limestone stratification to that in which the great Minera Mine has given its fortunate shareholders such immense profits, and can be cheaply accomplished by continuing the adit levels already driven under the runs of ore worked to water level, and cross-cutting to the side lodes, and thus at once draining the water for hundreds of fathoms, and avoiding the necessity of expensive pumping machinery for many years to come. JOHN L. M. FRASER, Consulting Mining Engineer, *Greenfield House, Wrexham.*

#### CARDIGANSHIRE MINES.

SIR,—As this county now appears to be attracting some attention I venture to give a few plain figures. Referring to the Share List in last week's Journal I find there are five Cardiganshire mines in the Dividend List and ten in the Non-Dividend List. The total capital of the five dividend-paying mines is 116,200%, and they have already returned in dividends 265,733%, or more than two and a-quarter times the original capital. Everyone of these mines is in as paying a state now as ever they were. The total capital of the non-dividend mines is 283,000%. Several of these have only passed into the Non-Dividend List owing to recent re-formation as new companies, many having previously returned large dividends, such, for instance, as Frongoch, Bronfloyd, Cambrian, Blaen Caelan, and Bwlch. The average age of the present companies working these 15 mines is not three years, so that an investment of 100% each—say, 1500%—would have already returned the investor 7½ per cent. per annum. Should he now realise his whole investment, the 500% sunk in the five dividend mines would at present prices realise 750%; and with regard to the ten non-dividend mines—four are not quoted, the other six, representing an investment of 600%, are quoted as worth 1000%; so that it is obvious that the investor, in addition to drawing 7½ per cent. from the date of his investment, would be able to realise at the present moment, and clear besides, at least 250% profit on his original capital, and this allows nothing for the four non-quoted shares, representing 400%, which is obviously unfair. But I think I have said enough to show that capitalists might do much worse than invest their money in Cardiganshire mines. FACTS, *July 29.*

#### CARDIGANSHIRE MINES.

SIR,—The very inclement weather last week prevented my going up, as I proposed, to the Rheidol Valley. I have, however, done so this week. I went first to the upper end of the valley, and visited Ystumtuen Mine. This place has been worked for lead ore at a very remote period, and probably is as ancient as any mine in Cardiganshire, but this is a matter of no moment; at the present time the workings consist of a deep adit level driven as a cross-cut for over 260 fms. to cut the lode under some old workings where the lode was exceedingly rich, producing in places as much as 8 tons to a fathom. The present run of ore ground is laid open for over 180 fms., the level having been driven both east and west on the course of the lode, but the principal shoots of ore are to the west, and in several places the lode is from 7 to 10 ft. wide, containing branches or ribs of ore 10 in. solid. To the east are all the shoots of ore dipping (west) from Penrhin and Bwyll Gwyn Mines, and so coming into Ystumtuen in depth, so that by sinking (say) 25 fms. under adit they would be met with; 10 fms. have already been sunk, but I shall suggest presently a plan for working much more economically at this point. The ground is whole above adit for about 20 fms. in height, and paying stopes could at once be opened up, as I am not over estimating in saying that on the average the whole of the 180 fms. would produce over 1½ ton to a fathom, and there is no reason to doubt that this lead is lasting for the whole 20 fms. in height, as the shallow levels produced ore, and in some places the ore was extraordinarily rich, as before stated; in fact, this mine has been one of the most productive mines ever found in Cardiganshire so close to surface. There is a most complete field of machinery for dressing on the most approved modern system, easily capable of returning 200 tons of ore per month, there being water-power in abundance from the River Rheidol. This plant of machinery cannot have cost less than 4000%, and with the available work already done there is a fair show for an outlay of 10,000%, and the ore in sight, after deducting half for cost of stopping and dressing, &c., may be roughly estimated as worth (above adit) 15,000%.

Immediately to the west is the Tyn-y-Fron Mine; this is lower down in the valley, and their deep level, if extended about 200 fms. on the course of the lode, would come 20 fms. under the Ystumtuen deep adit; and it is, therefore, obvious that these two mines ought to be worked together. With regard to the prospects of Tyn-y-Fron, the adit level is driven cross-cut for 26 fms., where it intersects the Ystumtuen lode, and driven east towards that mine 80 fms.; for the whole of this distance the lode is from 7 to 8 ft. wide, and composed of blende, lead, and copper of very fine quality, which cannot fail to produce paying ore in depth, and make a remunerative mine. A winze has been commenced below adit, and I saw a very fine pile of lead and blende ore lying at surface, which I was told came from this sinking. If these two mines were combined under one company there would be a great saving in working, and the ore could be dressed on Ystumtuen floors; and with sufficient working capital for laying open so extensive a property, these mines, when united, would offer an investment which would give immediate dividends, all the preliminary work being already done.

Following the course of the Rheidol on its way to the sea, we next come to the Dolfawr Mine; this also is only worked above adit, but a course of ore was discovered which yielded to Sir Thomas Bonsall a profit of over 30,000%, and even the old halvans have been worked for lead; what is wanted is to bring up the deep level,

which has not yet cut the lode from which the great deposit of ore was taken. Recently a new lode has been discovered, which runs parallel to Bonsall's lode, but very little work has yet been done on it. This property would require but a very moderate capital to open up. This is all that I have had time to see as yet. Dole Taliecin, July 29. CHARLES WILLIAMS.

#### MINERAL CORPORATION OF GREAT BRITAIN.

The subjoined letter, which has been received by Baron Crevecoeur from Mr. George Attwood, affords additional evidence of the groundlessness of the statement that any arrangement had been made for the examination of the company's mines or investigation of its affairs.—*London, July 24, 1880.*

MY DEAR BARON,—My name having been mentioned in the *Mining Journal* (of London) last week, and also by yourself in the same Journal of to-day's date, in relation to the Mineral Corporation of Great Britain, I must confess that I am astonished to find my name used in connection with a company of whose very existence I have until to-day been entirely ignorant, and about which I have never been professionally consulted, and of which I know nothing. Believe me, yours truly, GEORGE ATTWOOD, Mining and Civil Engineer.

#### LOW PRICE SHARES.

SIR,—Anyone carefully looking over the Mining Share List cannot help being struck with the low prices at which some mines are selling. It would appear some buyers are guided entirely by the price at which the shares can be purchased, irrespective of the number of shares in the mine. As an instance take the present price of East Lovell, about 1¼, in 1114 shares only, or less than 2000% for the entire property, not nearly the value of the machinery and plant. With two such splendid lodes for tin as are now being opened up, and a good working balance in hand, it must be evident to the most casual observer the price is ridiculously low. Not many years since the property was selling at over 50,000%, and declaring dividends of 6% 12s. 6d. per annum, and there are more unlikely things than the same may occur again. One thing is certain, there is no chance for a further fall in the shares, so a buyer at present has all to gain and nothing to lose. Another cheap share is East Buller, at about 25s. each, in 4096 shares. The prospects here are second to none in Cornwall. With a splendid plant and ample working capital this is undoubtedly one of the best speculations to be found, and as will be seen from Capt. Tregay's report three of the most important lodes in the Gwennap district may be cut into any day. I venture to predict should they cut good 10% each would be nearer the price the shares would command, but strange to say the public often will not look at a share while they are cheap, but as there is a run on them they became anxious buyers. I remember in April last year buying Wheal Kittys at 5s. each; this year I have received 15s. per share dividend, and the shares have been saleable at 7½ each. Many such instances could be quoted. INVESTOR.

[For remainder of Original Correspondence see this day's Journal.]

#### REPORT FROM CORNWALL.

July 29.—Our anticipation that we were not very far off an advance in the tin standards was realised on Saturday, when they were put up a couple of shillings, notwithstanding which the home market for shares closed easier than in the earlier part of the week. This, however, was by no means an unnatural result, and arose partly from the fact that there had been a substantial improvement in the share market in precedence of the advance, which had been pretty well discounted, and partly from the want of confidence produced by the exceedingly speculative character of the operations on the London metal market. But for this speculative element there is no reason why the margin should have increased so much as it did in the latter half of the week, and why Saturday should not have seen the standards leave off at least at 90s. and 91s., instead of 85s. and 86s.

It is impossible, however, to resist the conclusion that, in spite of the efforts of the "bears" (which have been made the subject of pictorial ridicule, much to the satisfaction of home producers), we are on the eve of a substantial advance. Even if we accept the very lowest estimate of the extent of stocks and of the probable balance of consumption and production. As we pointed out, the production at home has to a certain extent fallen off, and though it could not out-difficulty be brought up to its former amount, and even show an advance upon it, this result cannot be effected without time, so that a considerable period must elapse, taking into consideration also the falling off in the Australian and Tasmanian supplies, on which we have always laid stress as one of the most hopeful elements in the immediate future, as the supply can really overtake the demand. This, of course, whatever the efforts to disturb the market may produce in casual results, must mean a substantial advance in prices.

As an indication of the improved state of trade in the county attention may be called to the fact of the substantial improvement which has been shown in the affairs of the Falmouth Dock Company, chiefly caused by an increase in the harbour and quay dues, and the dues for discharging and reshipping cargoes. It is quite true the trade carried on at the docks is in the main of a general character, but it still has its mining connections, and, therefore, adds its share of testimony to the fact that the progress which has been made, in spite of all fluctuations, during the last few months is real, and not adventitious.

The Devonshire Association for the Advancement of Science, Literature, and Art held its meeting this week at Totnes, under the presidency of Dr. Oxland, F.R.S. Many scientific papers were read and discussed, but, singularly enough, none which had any special connection with mining affairs, though the excursions included an interesting one to the Ashburton and Buckfastleigh mining district, and specially to Brookwood Mine.

#### REPORT FROM DERBYSHIRE AND YORKSHIRE.

July 29.—Lead mining in North Derbyshire appears to be going on in a steady and satisfactory manner, more especially at the mines belonging to Mr. Wass. There are still, however, a good many mines from which but little lead is being extracted, and it is somewhat surprising how they are carried on. On Monday next the Chesterfield and Derbyshire Institute of Mining Engineers, accompanied by the president (Lord Edward Cavendish, M.P.), have their annual excursion to the lead mining districts of Derbyshire. The meeting will take place at Ambegate Station, and the first halt will be made at Darley Dale, a most pleasant spot, which we recently visited, and where the party will examine one of Mr. Wass's lead mines. Mr. Wass, it may be said, raises considerably more than one-half of all the yield of lead ore in the county. He will entertain the party to luncheon. The gardens of Staincliffe, belonging to Sir J. Whitworth, with their lofty floral escarpments, appearing as if at one time the place was a large quarry, will be thrown open to the engineers. Chapel-en-le-Frith and Castleton, with the Blue John Mine and others, will also form part of the attractions to the visitors. On Tuesday the party will drive through some beautiful scenery, unsurpassed in England, by way of Tideswell and Millers Dale to Buxton, where the general meeting, followed by a dinner, will be held.

The Mill Close Stoop Mine of Mr. Wass, it may be said, is a most prolific one, and last year produced 3300 tons of lead ore, more than one-half of the entire yield of the county. Local ironstone is only raised on a moderate scale, dependence being placed on the abundant supplies of Northamptonshire, whilst some is also being imported from Lincolnshire. After being an eyesore, having been standing idle for many years, the Oakerthorpe Ironworks, consisting of two blast-furnaces, have been taken by a coal company situated near Barnsley. One of the furnaces has been in blast for several weeks, and the second one is being got ready for work. There will, consequently, be an increase in the pig-producing power of Derbyshire, and at a rather opportune time, for business has recently increased, with rather better prices, with every probability of their being higher. Manufactured iron is in slightly better request as regards bars and merchant iron generally.

The coal trade of Derbyshire continues much the same as it has been for several weeks past, the mines being on short time, and prices particularly low and unremunerative. In house coal a tolerably fair tonnage is being forwarded to the Metropolis from Clay Cross, Eckington, and several other places. Steam coal, however, sells more freely, a good deal being sent away, whilst there is a considerable local consumption for furnace and other purposes.

An improvement of late has taken place in Sheffield, and several branches are now much busier than they have been for some time past. Ordinary brands of pig have been easier to sell at a slight



advance, whilst hematite has been in greater request at an advance of from 3s. to 4s. per ton. The mills have been kept fairly going on sheets and plates, whilst at the two great works orders for Government for armour-plates are being cleared off. Makers of Bessemer steel have been kept well going, several of our own railway companies having given out heavy contracts for rails now that they have reached a very low point in price. The Great Northern Company is said to have given out an order for 20,000 tons, a large portion of which has been taken in Sheffield and the neighbourhood. In addition to rails, tyres, axles, springs, and indeed every description of railway material just now is in brisk request. The demand for crucible steel has also improved, as the local requirements have increased. Sheep shears for the colonies, as well as for other countries, are going off well, so that the hands are now fully employed. Manufacturers of cutlery have recently received some good orders, more especially from America, for the finer qualities of knives, whilst makers of edge-tools are also much busier than they have been. At the foundries there has been little or no change, only a moderate business doing in builders' castings.

The Coal Trade of South Yorkshire is still in a depressed state, and some owners find it to their advantage to close their pits rather than go on as at present. The prices of house coal are such that sales only lead to a positive loss. This is more especially the case with respect to house coal, for which there is not much demand, as compared with the quantity that could be raised were there markets for it. This is the usual busy season for steam coal, and a heavy tonnage is being forwarded to Grimsby for shipment to the North of Europe, whilst a good deal is also being used for furnace purposes. Makers of coke have been doing tolerably well of late, and the requirements of consumers appear to be increasing.

The notice of the miners employed at the colliery belonging to the Barrow Hematite expired the early part of the week, when they left. It is intended to keep simply a sufficient staff to keep the roads and working places in an efficient state, so that should trade get better work could be at once resumed.

The Ardsworth Colliery, in Nottinghamshire, after standing still for about five weeks, owing to the explosion of one of the boilers, has resumed work. During the stoppage of work the boilers have been thoroughly repaired, and placed in a better position than they were previously.

#### TRADE OF THE TYNE AND WEAR

July 24.—There is not much change to notice in the state of the Coal and Coke Trades. There has been a little dullness observable on the north side of the Tyne, at the Northumberland Dock, and other shipping places, but it was caused more by a scarcity of tonnage than from a want of orders. The steam coal works are still fairly employed. At Tyne Dock the exports and imports have only been moderate during the week. The shipments of coal and coke have not been so large as usual. The Peninsular and Oriental Steam Company have made a contract for 10,000 tons of Cramlington steam coal to be sent to their foreign stations. The house coal trade improves but little, and in consequence Leasingthorne Colliery, near Auckland, is to be partially closed.

Mr. Bryson, the president of the Northumberland Mines Union, has incurred the censure of the miners in Durham and also of the Union leaders in many parts of the country, and he has also received the approbation of the employers who oppose the Bill for Compensation to Workmen. The views of Mr. Bryson on the Bill, and his general remarks on parliamentary measures regulating the working of mines, &c., appear to be peculiar, to say the least. No doubt it is always difficult to legislate on those matters, but great good has been effected by Mine Regulation Acts. By this means the sinking of two shafts was made imperative, and the safety of working coal mines has been vastly increased. It is absurd to talk of the men looking after the safety of mines or other works; as a rule the working men in mines and works of any kind know little of the general safety of the works. This must be left to the managers. The men can only judge of the isolated spot where they are employed as a rule. Should the Bill alluded to become law we do not think it will cause much litigation in the district. Workmen cannot indulge much in law, and it will only be in extreme cases, where negligence is evident, that the executives of Unions will sanction or enter into lawsuits for the purpose of recovering damages. The occurrence of explosions in mines when the whole mine is wrecked, and all the men and horses in it are destroyed, continues to harass both the owners and men employed in such mines. Those awful occurrences must to some extent deter men from working in mines, and also deter capitalists from embarking capital in them. Mr. Crauford, the secretary of the Durham Mines' Union, lately remarked that the passing of a Bill for compensation to workmen would have the effect of causing those explosions to disappear as if by magic.

Perhaps this is a view too sanguine to take, but there is no doubt that the passing of such a measure will have a tendency to prevent or reduce the number of these explosions. Such a calamity is very serious, causing enormous expense and loss to the owners, and the chance of having added to the cost 20,000£ for compensation will add to the calamity. It is evident that such an explosion cannot take place without an accumulation of gas to a large extent in the mine, and also at a point not far removed from the shafts; and such accumulations ought certainly to be prevented if possible. It is quite possible that means not yet tried may be necessary to prevent these accumulations, and it appears to be probable that when the coal measures have a considerable rise it may be necessary to have more than two shafts in use.

The Iron Trade continues very firm, and prices are tending upwards. The engine works on these rivers are well employed—that is, the marine engine and boiler works. Generally speaking the iron shipbuilding trade continues very good, and this causes the demand for engines and all other appliances required in those ships, which are mostly steamers, to be good. Only few works have many orders for land engines or locomotives in hand. Stephenson's works in Newcastle are busily engaged with locomotive, marine, and other engines. The great ironworks at Jarrow are fully engaged with iron ships and marine engines and boilers, many of them of large size. Messrs. Hawthorn and Co., Newcastle, are also fully engaged, mostly with marine engines. At Sir W. Armstrong and Co.'s works, at Elswick, there is a good deal of work on hand of various kinds. A large stock of Spanish hematite iron ore is held here, and the demand for the pig-iron produced here is good. An additional blast-furnace is now in course of construction at those works, and other extensions are in progress. Messrs. C. Mitchell and Co. will shortly launch another steel turret war vessel for the Chinese Government.

The revival of the iron, and manufacturing iron shipbuilding, and other trades in the district, has had a considerable effect on the value of the shares in several iron companies and also railways, but so far the value of collieries has not increased much. It is true that colliery shares do not appear so much in the market for sale, but when this has occurred of late there has been little competition for them. The demand for coal has not yet revived sufficiently to enhance prices so as to stimulate the demand for collieries brought into the market at all. The shares of Bolckow and Vaughan's works at Middlesbrough have risen 14 per cent. during the past year, and in the same time the shares of the Consett Iron Company have risen from 9 to 17 prem. The Jarrow Iron Company have improved 5½ per share. North-Eastern stock has risen 30½. There is an upward tendency, and a probability of further advances at the present time in many shares. The gas coal trade in Durham continues good, and, on the whole, the coal trade in the country has improved a little lately. The shipment of best steam coal at Blyth is increasing, and the best works in that district are fully employed; second-class works are employed eight to nine days per fortnight. The yield of lead from the Green Huth Mine continues to be highly satisfactory; it varies from 1 ton to 6 tons per fathom in the various levels.

The Iron Trade has been much stronger this week; No. 3 is now quoted at 44s. More iron is being taken out of store. Connell's stocks of warrants are now 92,000 tons. The exports of pig-iron have been a fair average for the week. The shipments of pig-iron have been rather less, 1100 tons of steel rails were sent to India from the Tees on Saturday. The reports from America and the Continent

continue to improve, and it is fully expected that the shipping of iron for America will be resumed shortly. Should the improvement continue more furnaces will be blown-in. Arrangements are being made for a larger output of iron and steel. The Eremus Steelworks are being pushed rapidly forward, and new works for the manufacture of agricultural implements, &c., are being erected at Middleton. More enquiries are made for iron goods and rails. Foundries are also getting more work. Prices of manufactured iron are firmer. Coke, 12s. to 13s. at Middlesbrough. The iron trade in West Cumberland has improved more than the Cleveland iron trade, and the higher prices now received have improved the prospects of the trade materially. Along the West Coast great efforts are being made to prepare for extended trade. New docks are being formed at Maryport, and it is expected that the docks at Workington will be enlarged. The coal trade has also improved a little, and the miners' wages have been increased in this county. The increased demand at the ironworks has stimulated the coal trade lately, and an increased output is expected. More attention has been paid to the coke trade, and also to the fire-brick trade in this district, and the prospects of the coal trade, on the whole, are improving.

#### REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

July 29.—On 'Change in Wolverhampton yesterday and in Birmingham to-day the pig-iron makers were immovable at their recent advances of 2s. 6d. and 5s., according to quality. Hematites were 3½. 15s. The business transacted in pigs was not large, as the higher prices checked sales. Finished iron sold better on home and foreign account. The United States enquiries for hoops and sheets are more numerous. Medium quality sheets used by the galvanisers were improved in request, and an advance of 10s. on the late minimum was demanded. Doubles of a good brand were even held at 9½. 5s. In their galvanised state sheets sold at a rise on the late minimum of 20s. Tube strips went off in larger bulk at 5½. 15s. to 6½. Coal and other minerals quiet, without alteration upon the week.

Upon 'Change in Birmingham, on Thursday, the market was somewhat upset by the announcement that Messrs. Phillip Williams and Sons, of Wednesbury Oak, had issued a circular to their customers announcing a drop in the price of their marked bars of 10s. per ton. It is not yet known whether the other list houses will follow.

The Cannock Chase miners have just held an important meeting. The notice for the termination of the Birmingham agreement, which regulates wages, expires on the 12th of next month, and the men are casting about for a substitute. They have passed a resolution in favour of the establishment of another agreement, but based upon the actual selling price of coal, and not upon the list price.

A special meeting of the Hamstead Park Colliery Company (Limited) has been called for next Tuesday, in Birmingham, at which the directors will submit a scheme for the raising of the capital by the issue of 5000 new preference shares of 20½. each, to bear interest at the rate of 7½. 10s. per annum. Messrs. Bailey, mining engineers, who have a claim of royalty on the estate, some time ago agreed to forego that for a cash payment of 8000£. They have now further agreed to take 8000£. in preference shares in lieu of the cash payment. The prospects of the company are reported to have been considerably improved since the discovery of the Thick coal.

An attempt has been made to re-open the pits which were recently set on fire at the Cannock and Wimblebury Colliery, but it has been found impossible to do this yet, as the fire is still burning fiercely. The upcast shaft has, therefore, been filled up for over 30 yards. There is no probability of the colliery working for a few months at least. The men who were employed at these pits find great difficulty in getting fresh work.

The fire-brick trade is being developed at Brierley Hill. For some months past trial sinkings have been going on in the Cricketfield estate in search of the celebrated seam of Stourbridge clay, and the results, it is stated, have proved satisfactory. The clay has been found in its true relative position, and its thickness and quality is up to the average of the district. There are already seven extensive fire-brick works in operation in the town of Brierley Hill; this will make the eighth.

Mr. Neale, the Recorder of Walsall, in charging the Grand Jury at the Quarter Sessions, referred to the verdict of the Coroner's court in connection with the late boiler explosion. The case, he said, showed the necessity of facilitating the taking out of patents upon inventions likely to prevent such accidents. He hoped a petition would be presented to Parliament, pointing out what a serious injury was done to commerce by keeping inventions back by saddling them with heavy expenses upon being patented.

#### REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

July 29.—Mr. Walter Keeping, in his recent contribution to the Geological Society, has, I feel sure, fallen into an error in assigning the metalliferous strata of Cardiganshire and Central Wales generally to the Llandovery series. This has arisen, as I think, from a too exclusive dependence upon fossil evidence—a class of evidence which in this case is more than usually, taken by itself, unreliable, from the very scarcity of fossils. If Mr. Keeping will take the Geological Map of Wales, and a few of the cross sections, he will see that the great undulations of strata that occur in the North are prolonged south-west into South Wales. He will further find that the synclinal troughs filled with Llandovery and Wenlock beds are barren of metals, while the anticlinal ridges, in which the Llandeilo beds come near the surface, are metal-bearing, and correspond in their extension south-west to the metalliferous belts of country in Cardiganshire. Further, it will be found, as I have more than once pointed out, that it is in the central parts of these ridges, or upward curves of strata, where the older rocks come near the surface, that copper ore is most plentiful. This is only one of several ways of testing this question, and I think it is more convincing and reliable than scanty fossil evidence; for, as Mr. Keeping knows, as time goes on some fossils are found to have a greater vertical range than was at first supposed.

Referring to the letters of Mr. Humphreys and "Lead Miner," a few weeks back, it may be safely stated that wherever in Denbighshire and Flintshire the lodes have been followed down into the underlying Silurian strata, which in this region would range from the Bala beds upwards, the lodes have become unproductive. This unproductiveness is not, therefore, a local phenomenon only. I would further say in answer to "Lead Miner" that there is not a single example in Wales of a lead mine being successfully worked in the Wenlock shale. The Pennant Mine to which he refers is not as yet an exception to this rule; indeed, it may be said that from the top of the Llandeilo beds to the base of the carboniferous limestone no lead mine is or has been successfully worked in that country. Mr. Humphreys refers to the mineral wealth in the carboniferous strata south of the Minera and Park Mines. He will find that in this direction there is a thinning out of the productive beds of the middle limestones, and not much success has as yet attended mining operations on this horizon south of the Park Mines. But the chert measures and the lead-bearing beds above the main limestones are, comparatively speaking, unproved. From their continuation southward to the Dee Valley, from the rolled boulders of lead ore that are found in the ravines that furrow their eastern slope, and from their great productiveness from Minera northwards, much may be expected from these strata in the future.

With regard to the proposed North Wales Institute of Mining Engineers, I am informed that the support given to the proposal, especially by gentlemen who might be expected to take prominent parts in the movement, was so meagre that the promoter felt the time was hardly ripe for the inauguration of such a movement. Possibly the promoter is too sensitive and too independent to press for lukewarm or unwilling adherents, otherwise the seeming indifference to his proposal might be overcome. Of the advantages to be derived by mining men and the country generally from such an institution there cannot be any doubt. However, from the number of letters having reference to mining in North Wales that appear in the Journal week by week we may both judge of the mining interest taken in the Principality, and we may also tabulate for our selves a large amount of useful information.

The Van Railway Company pay a dividend of 2 per cent. per annum, and owing to continued depression in trade they will not yet reopen the line for mineral traffic. The Liverpool Water Bill has now passed the House of Lords, and this great enterprise, which has been approved of in these pages from the beginning, will become a fact. The construction and maintenance of the works will greatly benefit the neighbourhood. Prof. McKenny Hughes is writing the life of the late Prof. Sedgwick. Sedgwick was the first man who unravelled the intricate geology of Wales. Owing to the greater influence of Murchison he got duddled out of his classification and nomenclature, which were true, and we may hope that Prof. Hughes, who is in full sympathy with Sedgwick's interpretation, will do the old man justice. Mr. Stewart Rendall, the new member for Montgomeryshire, very properly asked in the House of Commons why that county was not treated as a mineral county, and have its survey completed. Nobody seemed to know why!

#### REPORT FROM LINCOLNSHIRE.

July 29.—Of late there has been rather more doing in both ironstone and iron in North Lincolnshire, and the change for the better during the present year so far has been of a marked character, and there is every appearance of its continuing. In the neighbourhood of Frodingham a large quantity of stone is being raised, not only for the local works but for those at a distance. A considerable tonnage is being forwarded to South Yorkshire, to the works at Milton and Elsecar, as well as to others nearer Sheffield, for the lessees under Mr. R. Winn, M.P., include the Parkgate Iron Company, which has recently largely increased the output of pig. From Claxby the West Yorkshire Iron and Coal Company raised large quantities for the works at West Ardsley, near Leeds, and it is said that some more of the furnaces at that place are about to be put in blast, so that the consumption will be considerably increased. Messrs. Cliff and Son have also been raising a good deal, and burning a large quantity of pig. The Lincolnshire Iron Smelting Company are evidently in a more healthy state, and it is to be hoped that the improvement in the trade and the increase in the price will be the means of recouping the company their heavy losses in the early part of their career.

The Appleby Company, under the able management of Mr. W. J. Roseby, has been doing well, turning out a fine quality of iron suitable for almost any purpose. This is the result of using a considerable proportion of the stone mined near to the City of Lincoln. Indeed, the latter is now used at the other works, seeing that it corrects the excess of limestone which is found in the stone raised at Frodingham and the neighbourhood. The Lincolnshire iron smelting company has been working well of late. At the ironstone mines at Lincoln the output of stone for some time has been heavy, and is in good request. Ironstone from the Frodingham district is also finding its way into Derbyshire, and it is understood is mixed with that from Northamptonshire. Indeed, the Frodingham district was probably never in a more healthy state, all things considered, for the yield of stone has gone on increasing from year to year, whilst there has also been a great increase in the production of pig. Should trade continue brisk, and the demand for iron go on increasing, Frodingham promises to become a second Cleveland, seeing that the quantity of ironstone is almost inexhaustible, whilst there is railway accommodation by Doncaster to all parts of the kingdom, whilst the line also goes to the Humber. The stone in the locality named is got quite close to the surface, and in some places is 17 or 18 ft. in thickness.

#### Meetings of Public Companies.

##### ARUBA ISLAND GOLD MINING COMPANY.

A special general meeting of shareholders was held at the offices, Gresham House, on Friday, July 23.

Mr. J. V. SMEDLEY (the Chairman of the company) in the chair.

Mr. A. MACKENZIE (the secretary) read the notice calling the meeting, which was for the purpose of considering and if thought fit passing the following resolutions:—

- 1.—That the capital of the company be increased by the issue of new shares to the aggregate amount of 25,000£., to be divided into 25,000 shares of 1£. each, to be issued as fully paid up, with a preferential right to dividends at the rate of 25 per cent. per annum, such dividends if not paid when due or only partially paid to accumulate from year to year, and to be paid out of and to be a first charge upon the future net profits to be received by the company in priority to any payment of dividends on the existing ordinary shares of the company, and with a right to priority in the distribution of assets over the existing share capital.
- 2.—That the preference shares above referred to shall participate ratably in half the remaining net profits, after a sum equal to the aggregate amount paid to the said preference shareholders as representing their fixed dividend of 25 per cent. per annum shall have been divided amongst ordinary shareholders of the company.
- 3.—That the directors be empowered to treat with the existing debenture holders and other creditors of the company for a surrender or assignment of their overdue and still unpaid debentures and coupons and other debts or claims, on the terms of exchanging, or assigning, or releasing, the same to the company in exchange for such fully paid up 25 per cent. preferential shares of the new issue, amounting nominally to the same amount as the said unpaid debentures or coupons, and debts or claims, with interest at the rate of 10½. per cent. per annum, calculated to whatever periods may be arranged between the directors and the respective debenture holders and creditors, and such preference shares may be allotted at such periods as may be agreed upon between the directors and the respective debenture holders and creditors.
- 4.—That the directors may conclude an agreement or agreements on terms sanctioned by the last preceding resolution with such number of the existing unpaid debenture and coupon holders and creditors as may accept the terms offered by the directors, notwithstanding that others of the existing debenture holders and creditors may not accept such terms, or permit any principal or interest to remain a debt.
- 5.—That the directors may dispose for the benefit of the company of any or all the remaining part of the new issue of fully paid up preferential shares, including such as may not have been accepted or allotted in discharge of debts owing to the creditors of the company at such times and in such manner in all respects as they may think expedient in the interests of the company, but so that such shares shall not be disposed of for less than their par or nominal value.

The CHAIRMAN said—Gentlemen, you have heard read the resolutions which will be submitted for your approval to-day. The position of affairs is this:—The Agency Company, as you know, have been carrying on mining operations in Aruba under a working agreement with this company since December, 1877. Under that and a subsequent agreement in May, 1879, the Agency Company undertook to expend 10,000£. in carrying on and developing mining operations upon the island. These operations have been attended by many unforeseen difficulties, of which the chief were the deaths by fever of the company's mining captain and three other employees—a fever not contracted upon the Island of Aruba, which I am happy to say is an extremely healthy island, but taken at Puerto Cabello on their way out—and a difficulty at certain seasons in obtaining native labour, but which has now been removed by the privilege being conceded by the Government to import outside labour from neighbouring islands or from Europe. Notwithstanding these difficulties, however, the results of the working during the past two years and more have justified the shareholders of the Aruba Agency Company in proposing to expend further capital in the enterprise. Up to this date they have expended in fresh capital some 15,000£. Before going further, however, the Agency Company desire (and I think you will agree with the board that it is a reasonable wish) that this company should endeavour to become free of debt by making a reasonable offer for the capitalisation of all pecuniary claims against it, and thus satisfying the demands of its creditors. This company is in debt in round figures about 20,000£., consisting of 10,000£. over due debentures, with interest at 10 per cent., amounting to about 15,000£., to be added to which are cash advances and sundry floating debts with interest. It is to remove this indebtedness and to strengthen the position and credit of the Agency Company, upon whose operations this company's dividends largely depend, that the plan contained in the resolutions you have heard read by the secretary is proposed, and I may tell you that the board have already obtained the consent of a majority of the creditors thereto, and we anticipate that the others will give their adherence. When this arrangement is completed the company will be entirely free from debt, and whatever revenue will accrue to it in the future will be available for distribution between the ordinary and preference shareholders, according to the terms of the resolutions now proposed. As you are aware two of your directors, and I am one of them, are *ex officio* directors of the Agency Company. I am, therefore, in a position to inform you what the Agency Company now propose doing. The Agency Company are now proposing to increase their nominal capital from 20,000£. to 30,000£., and confidently expect to be in a dividend-paying position by the close of the present year. The average assay of some 2000 tons of the ore crushed has been about 1½ oz. per ton, and the average gold extracted therefrom by the first process by amalgamation has been about 14 dwts. per ton. A mass of tailings, estimated to contain 10,000£. worth of gold, is now under treatment, and a first instalment of 16 selected Italian miners, in charge of a competent English overseer, and under whom these Italians have been in the habit of working in gold mines in Italy, was dispatched to Aruba in May last, and they have all safely arrived on the island. Two highly skilled engineers have also been sent out lately, also a patent Luocp pulveriser, a pair of Warner windmills, with other machinery. A Fowler traction-engine and trucks, &c., are also under order, and are expected to be sent out next month. I mention these facts to show that the work is being energetically prosecuted on the island, and that no wise expenditure has been spared



upon the property to bring it into a sound paying condition. The resolutions were to be passed as special resolutions. I, therefore, put them from the chair as special resolutions.

Mr. DAWSON: The average assay would be more than 1½ oz. per ton. The CHAIRMAN said he would sooner put it within the mark than above it. That was practically all the information that he had to give the meeting. He wished there were a greater number of shareholders present. The report of the CHAIRMAN was largely—75,670¢.—Mr. CHAPLIN seconded the resolutions as they were. Mr. SEYMOUR: How long has the company been in existence?—The CHAIRMAN: Eight years. The phosphates will be another source of income to this company.

The resolutions were then put to the meeting and carried unanimously, and a vote of thanks having been passed to the Chairman, the meeting broke up.

#### NEW QUEBRADA COMPANY.

The ordinary general meeting of shareholders was held on Friday, July 23, at the City Terminus Hotel.

The chair was taken by the Hon. T. C. BRUCE, M.P.

The SECRETARY (Mr. N. G. Burch) read the notice convening the meeting, and the report of the directors, which had previously been circulated, was taken as read.

The CHAIRMAN: It is now my duty to make a few remarks in proposing the adoption of the report. The report is divided into several heads, and goes fully into details. I shall follow it in the same order, making a few supplementary remarks, which I think may be of interest to you. I am not going into details of the actual working of the different levels, because that is a subject very difficult of explanation, but I wish to point out that during the year under consideration—the year ending December, 1879—the works have been pushed forward with increased activity and with most favourable results. The amount of ore sent to this country has increased from about 8000 tons to 14,500 tons. It has maintained, notwithstanding the large increase, pretty nearly the same average as it did in the previous year, when the output was smaller and the power of choosing what was sent was easier than it is now. In addition to keeping up this large output not only has this amount of ore been sent home but considerable quantities of inferior ore have been placed on the dressing and roasting floors ready for smelting when the smelting-works are completed, as we think they will be very soon. In addition to that our managers there have not in the least relaxed their efforts in pushing on the exploratory works, so as to open up the property for the future as well as the present. These works have been carried on in a very satisfactory manner. In the progress of the deep level towards the north we find now that the mineral-producing part of the lode, instead of narrowing as it did at one point, is now opening out again, and becoming considerably wider. At the point at which the deep level has now arrived it is about 100 ft. wide, while some time before it was not more than 40 ft., and the ore on the east side—i.e., on the eastern wall, which has been proved by a cross-cut from the deep level—has proved very good. The quality of the ore to the west wall has yet proved, because the cross-cut there is not yet completed, so that we have every reason in that respect to say we have a large quantity of ore in sight for present and prospective operations. In addition, various operations have been carried on near the Santa Barbara level, which we informed you last year had turned out a very large and rich deposit of yellow ore of high quality. Further investigations have been made there, and further quantities of ore have been found. These works have been carried out with so much activity that we are informed by the manager, in his report dated the end of last year, that at that period we had 122,000 tons of ore in sight and within command on our present works, and this is represented as a very moderate estimate. Great progress, I may add, has been made in improving the ventilation of the mine, which at one time was very defective. Now, however, the ventilation is pretty perfect, and the manager states that at present it is perfect. There will be more works of the same character required as the levels are pushed forward, and meanwhile the facilities for discharging ore by shoots down to the lower levels have been improved. These facilities have resulted in a great diminution of the costs of working—they were 16,240¢. for 1879, as against 15,979¢. in 1878. Notwithstanding the very much larger output in 1879—over 14,000 tons, as against 8000 tons in 1878—the actual cost of labour in the mine has fallen 11¢. per ton from 11.18¢. in 1878 to 11.2¢. in 1879. At the same time the manager has carried on with great activity and perseverance those works of exploration which are necessary to provide for our future returns, and the cost of all those works is included in the sum I have mentioned, but by putting the mines into better order, and giving greater facilities, he has been able to turn out his ore at a very considerably reduced cost. We have no intention to rest satisfied with this large quantity of ore, and have no reason to doubt that further explorations will reveal very much larger quantities, and the board have under consideration how far it will be desirable to introduce boring machinery so as to carry on the work more rapidly either from the present deep level, or perhaps, if it is considered desirable, by going down lower, where we have no doubt large quantities of ore will be found, but where we shall have to pump, and it is a consideration how far it is desirable to do so. I cannot help repeating our very great satisfaction at the way in which our manager, Mr. Holman, performs his duties at the mine, as well as the other gentlemen who are under him. I think the shareholders have every reason to feel as confident in him as we do, and that they would not do wrong in expressing their thanks to him for the very admirable, energetic, and intelligent manner in which he performs his duties. I will not go into details about the smaller mines—the Titara and Santa Ana—on which we have not pushed explorations. We are exploring a very large extent of ground where we are, and we want to carry that on to get the command of a very large amount of ore before we begin trying at a further distance. It remains to be seen whether the lode we are now working at Aroa will not continue northwards and join the Titara. We find ore in these smaller mines, but they are not opened up in such a way as to contribute to the returns of the year. We have paid great attention to the smelting department, and have reason to believe that the results will be a very large increase indeed to our returns. We have now the machinery on the ground, and everything prepared for its reception. Part of the ore which has been collected has been roasted, and there are large heaps to go on with; and, in fact, things are so nearly ready that we are expecting very shortly to receive a telegram to say that these works are in operation, and when it arrives we shall send out some notification to the shareholders. In all mines, I need not tell you, there are variations in the quality of the minerals that you meet, and we are not exempt from the characteristic which is common to them. Now and then we come upon parcels of ore which are not sufficiently charged with copper for export direct, but by this process of smelting we shall be able to utilise all these ore down to a very low percentage indeed. We shall clear our works, improve their position, and withal, no doubt, get a very considerable profit out of this ore. Statements of figures are always more or less subject to revision in after experience, but profiting by the experience of other people we have reason to suppose that we shall be able to produce some 3000 tons of this regulus, which we shall send home, and which on present prices should leave us a profit of some thing like 30,000¢. a year; but I only mention these figures as an indication of what we at present believe may be expected. Now I come to the new contract into which we have entered with the Bolivar Railway Company. You are aware that under the agreement of 1873, which was made in contemplation of the making of that railway, they were entitled to a minimum payment from us of 85,000¢. a year. That, I need not say, has never been paid in full; so that in dealing with them we have to deal with a party that has prior right to our own, and we cannot deal with them as though we were entirely independent. The agreement under which we are now working contains very liberal concessions in consideration of the position in which we were. They restricted the minimum payment to 30,000¢. instead of 85,000¢., and they took certain rates for the carriage of produce which was sent beyond that, but inasmuch as we have reason to expect this year a very large increase in the quantity to be sent home, as well as of the returns—an increase which they would have a right to claim up to 85,000¢. a year—they naturally demurred to remaining under those conditions, and we had a further cause which rendered it necessary for us to make a new arrangement with them of a more lengthened character—and that was to provide a high class of security for the issue of debentures which it is proposed to make, so as to put an end to the debt which has hampered us. Now, in order to make a security for that, it was necessary to get the railway companies to consent for a period of years for retentions to be made out of their dividends which would otherwise be paid to the shareholders under which we entered into the fresh negotiations. They were carried on at great length, and resulted in the new agreement. The agreement contains this main clause, that of all the ore shipped there would be prior to any payment to the Bolivar Railway Company a deduction of 2¢. per ton of all the raw ore, and 6¢. per unit of copper in the regulus sent back. That 6¢. will amount to about 10¢. or 12¢. per ton on each ton of regulus. These sums are a prior charge consented to by them on the whole of the returns, and secured by this agreement. These sums will not only be a sufficient guarantee for the debentures and the sinking fund of the new bonds which we propose to issue, but if the produce goes on, as we have reason to believe it will do, it will leave a large sum for this company in addition after payment of all our expenses of every kind. That being done the Bolivar Company have claimed not 85,000¢. but 50,000¢. a year as payment to them. There is one peculiarity about that. Under the present agreement if we pay them 30,000¢. in a year their right of entry is barred, and we have succeeded in maintaining that condition in the new agreement, so that if by any accident we were not to send produce to the extent of more than 30,000¢. a year after paying the preferential claims they would still be unable to exercise the power to enter the property. You see then that we continue the payments up to the amount of 50,000¢. instead of 85,000¢. the next 50,000¢. comes entirely to us, and after 55,000¢. the surplus is to be divided between us and the Bolivar Company equally. We think the agreement has secured for us the principal results needful for us. It has placed a limit upon the charge they were enabled to make. It has placed a still more strict limit upon their power of entry, and it has given us as perfectly safe a basis as possible for clearing off our debts and placing us on a regular footing. The agreement is for 20 years, or as long as any debentures remain unpaid. In the case of the debentures being paid off at an earlier period—in the proposed issue we reserve power to pay them off when we think it necessary—the agreement would terminate, and we might then negotiate again. These agreements are only in suspension of the original agreement of 1873, which they maintain and can maintain in the event of the cessation of any of these temporary agreements. With reference to the existing debentures, they all fall due about this time, and we thought that inasmuch as we had now turned the corner and got our present position with reference to the working of this mine that it was much better to make a clean sweep of all our indebtedness, to consolidate it in the way we propose, and to start fair in future, so as to be able to pay our dividends instead of keeping the sums back for discharging the floating debt. On those grounds we propose to you this issue—a sum of 100,000¢. nominal, to be issued at 85¢. per cent. interest, and with a sinking fund at par. That 85,000¢. will clear off all the sums we owe both for the debentures and for the debt, and we shall now proceed with a clean sheet, and all the sums which come to us can be distributed as you think it necessary. The present charge for interest amounts to 7200¢.; the actual annual charge for interest on

the new proposed debentures will be 6000¢., but we propose to add to that a sum of 2718¢. as a sinking fund, which will extinguish these debentures within 20 years, but we can do so sooner if we like. We believe this arrangement will greatly facilitate our operations, and place the company in a far better position. I have to propose that out of the profits of the year we should pay a dividend at the rate of 25¢. 6d. per share, carrying over a sum of about 4000¢. to the next account. I may congratulate myself on being the first Chairman of the company to whom the privilege has fallen of announcing a dividend. (Cheers.) I do not by any means take any credit to myself for that, but I am very pleased that I should be so fortunate. It is far from me to say that this dividend is a large one, or that it is by any means the measure of the real value of the property of this company, but quite the contrary. I have been told that I have been in the habit of speaking in too phlegmatic a manner about the prospects of this company, and I have done so because I consider it especially the duty of gentlemen who speak to you from this chair not to raise any hopes which they are not quite certain will be realised. On this occasion I think I may be allowed a little more indulgence, because I think we have the materials before us of a well grounded hope that these anticipations will not be disappointed. We have got the property into good working order, and made many improvements. We have secured a large supply of ore, and from the investigations we have made we have reason to believe that there is a much larger quantity behind, and this without touching upon new fields of which we have the command, and which we can open afterwards. I hope and believe there will be a steady increase of dividends, and that we shall be able to maintain and carry on the works without difficulty and give you something like that return for which you have waited so long with so much patience and forbearance. You all deserve reward of the kind I have named, and I trust it will come in, due course. The Chairman concluded by moving the adoption of the report.

Mr. T. MEATES (Deputy Chairman) seconded the motion.

Mr. KIMBER asked if the debentures would constitute the usual charge upon the whole undertaking?—The CHAIRMAN: The first charge.

Mr. FERRARD asked if the "retention" fund of 2718¢. would be set aside each year.—The CHAIRMAN said it would, and probably a great deal more. Whatever remained over beyond what he had already mentioned might be put aside to a sinking fund.

Mr. FERRARD: Shall we have any power to pay interim dividends?—The CHAIRMAN said he did not think they could under their present arrangements of accounts with the Bolivar Company.

Mr. KIMBER suggested that the Bolivar Company might consent to make up the accounts half-yearly.

The CHAIRMAN said the board would take the matter into consideration.

Mr. FERRARD: On what terms can we buy the Bolivar Railway?—The CHAIRMAN: By paying the cost of construction and making an extra payment on the accounts of 30¢. per cent. The option is at ten years from the date the railway was opened.

A SHAREHOLDER said that the company possessed a lot of timber; could nothing be done with it to make it contribute to the profits?—The CHAIRMAN replied that the timber trade was much depressed, but some consignments sent over had been disposed of satisfactorily. The subject was not lost sight of.

Mr. WARD adverted to the original agreement made with the Bolivar Company as improvident, and as to the concessions they had made he was aware that the Bolivar Company was the master of the situation. But it was no use criticising the past. He believed the present directors had done the best they could. Had any arrangement been made with the old debenture-holders to be new ones? He thought the prospects of the copper market were good, and hoped the board had not much ore unsold.

The CHAIRMAN: I think only one cargo.

Mr. KIMBER said that when the original arrangement was made with the Bolivar Company the New Quebrada Company was helpless. The Bolivar Company was born of this company, and pronounced the terms on which it should come into existence. But for the aid of a distinguished firm it would never have been floated or been sustained afterwards. Personally he would be glad to take his proportion of the new debentures.

The report was then adopted unanimously.

The CHAIRMAN moved, and Mr. WARD seconded, the declaration of a dividend of 25¢. 6d. per share, payable on the evening of the 29th inst.

Mr. WARD hoped the question of amalgamation between the two companies was not being lost sight of.—The CHAIRMAN said the New Quebrada was improving so much that it would be able to make better terms by-and-by. He then moved, and Mr. JAMES ANDERSON seconded, "That the directors be empowered to make arrangements for funding the existing debentures and floating debt of the company, and they are hereby authorised to borrow money for that purpose upon mortgage bonds or debentures not exceeding 100,000¢., to carry interest after the rate of 6 per cent. per annum, and to be issued at 85 per cent., and constituting a first charge upon the estates and property of the company in Venezuela, in such form as to the directors may seem fit." This was carried unanimously, and he (the Chairman) mentioned that about one-half of the new issue had been already applied for.

Mr. KIMBER proposed a vote of thanks to the Chairman, which was carried unanimously.

Mr. WARD proposed a similar motion as regarded the manager (Mr. Holman) and the other officers, and with the carrying of this the meeting was brought to a close.

#### NORTH BUSY UNITED MINES.

A three-monthly meeting of adventurers was held at the mine, on Thursday, Mr. TOM MOORE presiding. There was a large attendance of shareholders, who are looking forward with confidence to the mine becoming an excellent property in a short time. The accounts for the quarter showed that the labour cost was 728¢. 8s. 4d.; merchants' bills, 289¢. 11s. 8d.; lord's dues, 18¢. 4s. 7d.; a 45-in. cylinder engine and engine-house, purchased from Burra Burra adventurers, 300¢.; rates, 10¢. 8s. 4d.; bank charges to June (six months), 17¢. 6s. 7d. On the other hand, there were 789 tons 1 cwt. of tinstone sold, which realised 1066¢. 7s. 6d., showing a profit of 146¢. 3s. 11d. after all the extra expenditure had been charged. The balance brought forward from last account was 444¢. 15s. 11d.

The PURSER (Mr. Thorman Woodward) drew attention to some of the extra charges included in the statement of accounts. There was, for instance, 300¢. for the pumping-engine, 108¢. already paid towards building the engine-house, and about 80¢. for new timber, amounting altogether to about 500¢. Had it not been for this necessary outlay he thought they would agree with him that they would have had very satisfactory results; but for it with the 146¢. now to carry forward, they would have had something like 600¢. or 700¢. in favour of the adventurers that day.

The CHAIRMAN said they must all take the accounts as exceedingly satisfactory. Not very long ago they found a green field intersected with little channels of mud, and now they had a neat little mine, with every prospect of success. It was stated that it was a very unwise thing to throw money into such a concern as that; that they had made a great mistake; that they would rue the day, and so on, but he was pleased to find that it had proved so very satisfactory, and that after having built the engine-house, bought the engine, sunk a shaft, and carried on the working of the mine, that they had been able to bring the costs up so close. They had a credit balance at the bank in their favour, instead of having to meet, as is customary in mining, a deficit. Instead of asking them that day to put their hands into their pockets, they were in a very favourable position for paying a dividend, but he would not say when they should have it. The position which they then occupied was very gratifying indeed, and their thanks were due to the efficient management of Capt. James, who had worked the concern so creditably during the quarter. Their thanks were also due to Capt. Priske for superintending the operations which have been going on so satisfactorily, and if it had not been for him and Capt. James they would not have been in such a favourable position as they were at the present time. He was very glad they had met under such encouraging circumstances. After having laid out about 700¢., which seemed a deal of money to expend, it was very gratifying to find that they had still a balance in hand.

The agent (Capt. John James) reported as follows:—Since your last meeting we have sunk a new engine-shaft 28 fms. from surface, or 6 fms. below the adit, or 22, and divided the same, and fixed bearings for the plunger-lift at the adit. I purpose sinking 4 fms. more, and commence to drive a cross-cut south of the lode. This will drain the lode, which will enable us to sink below the adit with great speed. At the adit we have driven a cross-cut north (16 fms.) from lode to new engine-shaft. This was done for ventilation, and to take off any surplus we may have that will not be required at surface. The engine-house has been built, the cost of which is charged in the accounts laid before you. Our present operations are as follows:—The sink or winze below the adit lode, 7 ft. wide, is worth 22¢. per fathom; sinking by nine men, at 11¢. per fathom. In the slope east of winze the lode is from 3 to 5 ft. wide, worth 20¢. per fathom; stopping by twelve men, at 3¢. 5s. per fathom. In the slope west of winze the lode is 4 ft. wide, worth 18¢. per fathom; stopping by two men and two boys, at 3¢. per fathom. The engine-shaft is being sunk below the adit by six men and six boys, at 4¢. 10s. per fathom. We have not made the progress here that we expected on account of the ground being harder, caused by branches of quartz dropping in from the north. We have now got through these, and hope to make better progress in future. We have driven a level through the old workings 20 fms., and have now one man and boy stopping the bottom of the 15, at 1¢. 2s. 6d. per fathom; lode producing a little blende and murex. This is being done to bring back the water from the old mine to the present adit, and while completing I think our some ground that will work on tribute. In my report for the last meeting it was said the cost would be paid provided we could draw the water from the sink. This has been done, as you see by the account presented to-day. I see no falling off in the lode, which is opening up quite as well as expected, and if opened on in the next level of the same value as now the returns will greatly increase.

The CHAIRMAN thought that the simplicity, truthfulness, and correct statement of that report were eminently satisfactory. He quite agreed with Capt. James that if their returns increased they would have a very respectable balance, seeing that they would not want to lay out 500¢. or 600¢. in buildings, &c., for the next quarter as they had this time.

The statement of accounts and agent's report were passed, after which Mr. CHELLEW moved that the gentlemen who took an active part in furthering the progress of the mine be formed into a committee (Messrs. Webber, Priske, Moore and Bain) to continue their services.

Mr. WHITEWORTH seconded the motion, and it was carried unanimously.

Mr. WEBBER moved that the banking account be transferred from the Miners' Bank, Truro, to Messrs. Bain, Field, Hitchins, and Co.'s Redruth and District Bank, Redruth.

Mr. JOHN THOMAS suggested that, as they had no reason to complain of the accommodation afforded them at the Miners' Bank, and that the removal was only in consequence of the principal shareholders residing in Redruth, if the removal was made something to that effect should be stated in the resolution.

Mr. WEBBER said that he had not the slightest objection, and the motion being seconded by Mr. WILLIAM NICHOLL, it was carried unanimously.

Mr. J. THOMAS, in moving that Capt. Priske be appointed official consulting agent, at a salary of six guineas a month, said that, knowing how good a miner he was, he thought it very much to the advantage of the mines that his opinion should be officially taken.—The CHAIRMAN said he was quite sure that if that resolution had been passed at the last meeting they would not have paid for it the full value of the services that had been rendered by Capt. Priske, but he hoped it would stimulate him into further activity to the benefit of the shareholders.—The motion was seconded by Mr. JOHN MARTIN, and carried unanimously.

Capt. PRISKE thanked them for their kindness. He would say nothing for himself, but with regard to Capt. James he felt bound to say a word on his behalf. It was to him their applause was due, and they might feel thankful that they had such a man at the helm to manage their affairs.

Mr. MARTIN moved that in consideration of Capt. Henry Trevethan having fully carried out (although at a considerable loss to himself) his guarantee made at the last meeting, that he be presented with 50¢. towards his loss, and for the stuff about the floors. The price of tin having gone down since the last meeting, he thought Capt. Trevethan must have sustained a considerable loss.

Mr. W. MICHELL, sen., agreed that compensation should be given to Capt. Trevethan, but he thought, in consideration of his great loss, 100¢. would not be too much.—The CHAIRMAN said he was very pleased at the manner in which the arrangements had been carried out by Capt. Trevethan, but he thought his loss was caused partly by an error in judgement, and suggested that they go between the two sums named, and make it 75¢., that they might be unanimous.

Mr. MARTIN said he had known Capt. Trevethan for a great number of years, and had never known him to do a dishonourable action in his life. (Applause.) He would, with the permission of the Chairman, propose that he be presented with 75¢. instead of 50¢.—The motion was carried unanimously.

In answer to Mr. Thomas, Capt. PRISKE said that the price of tin would greatly depend upon Mr. Strauss. (Laughter.) He believed their returns would increase.

The CHAIRMAN did not think the tin markets were ruled by any one man in particular. It was, in his opinion, ruled by the course of events, and the course of events he thought was in their favour. He was looking at some of the London papers a short while since, and from certain statistics it appeared that they had had 1500 less failures this year in comparison with last. They had 7000 less paupers, and the railways earned 6000¢. more during the last six months. Looking at these facts and that imports and exports were increasing, it showed, he thought, a general movement for the better all round, and he quite thought they had to look forward to a good tin season. (Hear, hear.)

Mr. CHELLEW asked who were the surgeons of the mine, when a long discussion ensued as to whether they should appoint medical men or leave it in the hands of the miners to select their own doctor, but the matter was ultimately dropped for future consideration.

After dinner the usual loyal and complimentary toasts were drunk. The toast of the day, "Success to North Busy," with which was coupled the names of Capt. James and Priske, given by the CHAIRMAN, was responded to by the latter. He said they might expect a handsome present in the shape of a dividend, he would not say at the next meeting, but about Christmas time. (Hear, hear.) He would not advise them to be too anxious to call for a dividend—(hear, hear)—although they had every prospect for the future, and everything looked bright and encouraging for North Wheal Busy. (Applause.)

Mr. NICHOLL, in responding to the toast of the "Old Shareholders," said he thought there was a chance of doing something very good in that mine, as it was one of the best growing youths that they had had in the county for many a long year. He was very pleased to see a new set of adventurers in the mine, and he felt sure that they would be handsomely rewarded for their outlay.

The "Broking Interest" was responded to by Mr. J. THOMAS and Mr. WARD, and the meeting terminated.

#### THE AUSTRALIAN MINING COMPANY.

The annual general meeting of shareholders was held at the Guildhall Tavern, on Monday.

Mr. HENRY COLLIER (the Chairman) presiding.

The SECRETARY read the notice calling the meeting. The report and accounts were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said the only remark he had to make in reference to them was that since the report was written Mr. Davenport had written to say that all the olives had been planted, and as a few showers had since fallen, he hoped this time the olive plantation would be a permanent and satisfactory one. Olives did not require much rain when once settled in the ground, but until the roots found their way well into the earth they required a good deal of moisture; but when once started a little moisture kept them alive.

Mr. WHITE asked whether the hopes of an increased dividend depended solely upon the olives?—Mr. FRED. COLLIER (the Deputy-Chairman) said it did not entirely depend upon the olives, but it did to some extent. The improvement in the position of the company and the value of the property depended upon the improvement of the land and of the tenants' position.

Mr. H. GORDON: There was some talk about a discovery of gold in the company's property, but mining has been discontinued, so I suppose the gold said to be there turned out to be not worth working.

Sir CHARLES WHETHAM: That was for copper.—Mr. GORDON: But I suppose the gold also turns out not worth working, and the company cannot rely upon dividends from that source?—Mr. F. COLLIER: Certainly not.

A short discussion took place, in which two or three shareholders, whilst admitting the ability of the directors and the energy of Mr. Davenport (the manager), suggested whether some more active measures could not be taken, or some measures adopted, to increase the present dividend of 1½ per cent. upon the capital.

Sir CHARLES WHETHAM (a director) said that what the shareholders must do was to look back upon the working of the company. This company was not started solely and wholly with a view to making money, but the idea was that it was to be a mining company, but after many years of testings and trials the results were disappointing, and shareholders unanimously decided to give up mining. The shareholders must not put their dividend against all the money which had been spent, but they must look at the dividend as arising from land purchased, and if they saw that it cost something like 22,000¢., and the directors gave a dividend of 1800¢., it was equal to 10 per cent. upon the land. All the rest was mere speculation. The directors determined to husband their land, and do the best to let it as they could, and be contented. It was utterly impossible for the directors to do more than they were doing. What was wanted was an increase of population, and till the time arrived it was utterly impossible to do much to improve the property. The time had not yet arrived for disposing of the property. The land was being let to persons at low rates, by which they would get it better maintained and manured. The shareholders could not do anything but wait until the land improved and the population increased. (Hear, hear.)

A SHAREHOLDER drew attention to the fact that the arrears of rents of land were larger, and asked the cause of this?—Mr. F. COLLIER said these would soon be paid off. The time for payment varied from year to year, and the bulk of those arrears would be recovered.

Mr. REW spoke in favour of what he called the conservative policy of the board, as opposed to the speculative policy, which one or two gentlemen had advocated in that room. He was glad to hear from the other side of the table that what he might call the non-speculative policy would be persevered in. (Hear, hear.)—Sir CHARLES WHETHAM: We are unanimous at the board on that point.—A SHAREHOLDER: It must be persevered in.

The resolution for the adoption of the report and accounts was then put and carried.—The retiring directors—Sir Charles Whetham and Mr. George Palmer, Jun.—were then re-elected, and Messrs. Messrs. J. Grove, C. Ehrenberger, and T. White were then re-appointed.

The CHAIRMAN: I move that the thanks of the meeting be given to Mr. Davenport for his valuable services. I should mention that I have considerable personal acquaintance with the country, and I know of no man more esteemed or more looked up to for any extraordinary or special duty with respect to the welfare of the colony than Mr. Davenport. He was the life and soul of the representation of Australia at the recent Exhibition in Sydney, and his fellow colonists think very highly of him. As to his services to this company they are very great, and if we lose him I do not know who could take his place, and I do not know of anyone in whose judgment, skill, and ability I should place more reliance than in Mr. Davenport.—Sir CHARLES WHETHAM seconded the resolution, which was put and carried.

Sir CHARLES WHETHAM said that before the meeting separated he wished to acknowledge his re-election, and at the same time take the opportunity of assuring the shareholders that the anxious wish of the directors was to improve the value of the property and also the dividend.

The CHAIRMAN also said that the policy which the board were pursuing was the best possible under the circumstances. Nothing could be done at present but to remain quiet, and he hoped that at some future time they would obtain better results than at present. (Hear, hear.)

A vote of thanks to the Chairman and directors closed the proceedings.

[For remainder of Meetings, see to-day's Journal.]

NICKEL PLATING.—The Plating Company of the Bishopston-lane Works, Stockton-on-Tees, have just taken a contract for nickel plating twelve sets of marine engine fittings, which is the second from the same firm. These works have also just nickel plated a very large engine for a London rice mill, on account of the well-known firm of Messrs. Thwaites Brothers, Vulcan Ironworks, Bradford. The plating is specially suited for engine fittings of all kinds.

ST. JUST UNITED MINES.—These mines are being got rapidly into working order. A new winding-engine has been set to work. One of Mr. Sholl's patent pneumatic stamping machines has been erected, and is expected to be in operation in about a fortnight. By that time several thousand sacks of stuff will be waiting to be pulverised. The 120 has been driven into the rich bunch worked on by the former adventurers, and it is found as was expected. Having driven under the former workings, the managers will be able to take away large quantities of stuff at the minimum of expense. A further good discovery has been made in this mine. In excavating for some round boulders for the pneumatic stamps, the men have come upon the back of a lode which is yielding splendid stones of tin, and as the junction of the granite and killas occurs very near this spot, it is quite thought that this is the top of a bunch.

HOLLOWAY'S PILLS.—This cooling medicine has the happiest effect when the blood is overheated and a tendency to inflammatory action is set up in the system; one pill taken shortly before dinner does away with the indigestion, fulness and flatulency—indications of a weak stomach or disordered liver. A few pills taken at bedtime act as alteratives and aperients; they not only relieve the bowels, but regulate every organ connected with them, overcome all humours, and encourage a free supply of all the secretions essential to our well-being. Holloway's pills thoroughly cleanse and perfectly regulate the circulation, and beget a feeling of comfort in hot climates and high temperatures, which is most desirable for preservation of health.



## Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES\*—No. CLVIII.

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In the last lecture we stated that the production of an air current along the level is caused by a difference in the weight of the air columns; but we deducted the velocity from the height of the motive column without touching upon the actual weights and difference in weight of the two air columns. As it is of importance to know the actual weights in calculating the power of natural ventilation, we shall go through the discussion for obtaining the velocity from the difference in weight of the two air columns.

A cubic foot of air at the temperature of melting ice (32°), and under a pressure of 14.7 lbs. per square inch (30 in. of barometric pressure), weighs 0.080,728 lb. At the temperature of 0° Fahr. and under the same barometric pressure, a cubic foot of air weighs 0.086,356 lb. We have already stated that air expands 1.459th, of its volume at 0° Fahr. per degree rise of temperature. And since the volume of a given quantity of air is in inverse proportion to the pressure under which it is, the weight of a given volume of air is in direct proportion to the barometric pressure; hence the weight of a cubic foot of air at (say) 1 in. barometric pressure is 1.30 times its weight at 30 ins. barometric pressure.

The velocity of the air current is equal to eight times the square root of the height of a column of air of the same sectional area as the shaft, whose weight is equal to the above pressure. To obtain the value of the height in feet we must, therefore, divide the above motive pressure (the difference in weight of the two air columns) by the weight of a cubic foot of air at the temperature of the mine, and the quotient by the sectional area of the shaft.

These values obtained will be seen as the same as those given in the last lecture. It was there pointed out that the following general results may be deduced when frictional and other resistances are not taken into account.

1.—The velocity and consequently the amount of air passed through the mine is proportional to the square root of the depth of the shaft.

2.—The velocity and the quantity of air passed through the mine is proportional to the square root of the difference in the temperature at the surface and underground.

These results show the importance of so arranging the openings by which the air enters and leaves the mine as to obtain the greatest difference in the temperature of the intake and return air currents, and the greatest difference in the levels of the intake and the exit openings.

The difference in level of the openings is often increased by the building a chimney over the mouth of the shaft. Such an arrangement is common in Belgium, in the neighbourhood of Liege, and in some districts in England and Germany. In the driving of adit levels the air current is often increased by bratticing the level across from side to side at a distance of a few feet below the roof, and sinking a short shaft on to the level at a distance of a few yards from the mouth of the level, the shaft being surmounted by a chimney. The upper part of the level above the bratticing is stopped off between the shaft and the mouth of the level. The air enters during winter below the bratticing, and returns along the top and out through the chimney. In very hilly districts it is sometimes usual to carry the currents from the highest point of exit from the mine on to the side of the hill, along a brick culvert carried a greater or less distance up the full rise of the hill side. In Belgium the chimneys or towers are carried often to a height of more than 50 yds. above the surface of the ground. The percentage increase of ventilation is so much the smaller the greater the depth of the shaft. If we take the case of a shaft 200 yards deep, and suppose what is not strictly correct, that the temperature in the tower remains the same as in the shaft (that there is no cooling effect due to the walls of the tower), then we have in the case of a tower 20, 30, 40, 50 yards high, a total depth of 220, 230, 240, and 250 yards.

The velocities, and consequently the amount, of air circulated are respectively in the proportion of the square roots of the total depths. Suppose again the case of four shafts respectively 100, 150, 200, and 300 yards in depth. The velocities and amounts of air circulated are then respectively as 10, 12.3, 14.1, and 17.2.

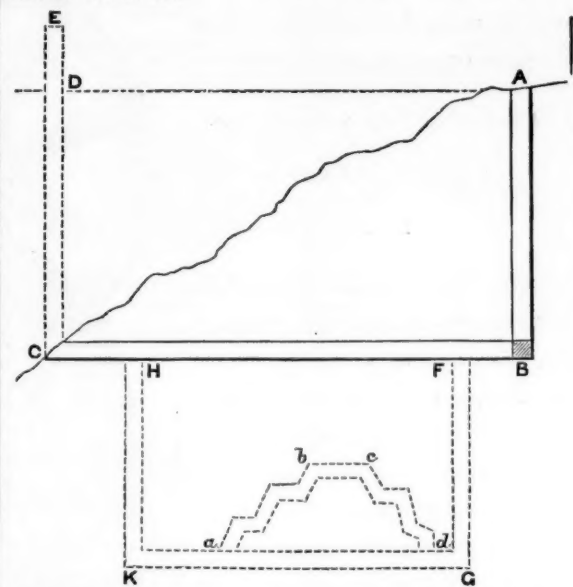
Suppose a tower 50 yards in height built over these shafts, the total depths are then 150, 200, 250, and 350 yards, and the velocities and amounts of air circulated are relatively as 12.2 : 14.1 : 15.8 : 18.7, so that the actual increase in each of these cases is as 2.2 : 1.9 : 1.7 and 1.5, with corresponding relative increase in each case, or about 1.5th, 1.6th, 1.8th, 1.1th.

From the above example it will be seen that the addition of a tower 50 yards in height gives an actual increase of ventilation in the case of a shaft 300 yards deep of only three-fourths the amount of the increase which it gives in the case of a shaft 100 yards deep; and that for the case of two shafts respectively 100 yards and 300 yards deep, each passing the same amount of air, the addition of a tower 50 yards in height, whilst giving an increase of 1.5th in the first case, gives an increase of only 1.1th in the latter case. These examples show plainly that the useful effect of adding a tower is so much the less the greater the depth of the shaft; and that the effect it does not greatly feel unless the height of the tower exceeds 1.4th the depth of the shaft. It must be understood that these examples refer to the use of towers of the same diameter as the shaft; in fact, a tower of a smaller diameter than the shaft might readily increase the resistances so as to lessen rather than increase the amount of ventilation. The use of a tower has not only the drawback of being expensive, since it must be kept of the full diameter of the shaft; but in consequence of the fact that the brickwork is cooled by the winds, and it in its turn cools the ascending current, the full advantage of the additional height can never be obtained. One of the principal advantages in the use of such ventilating towers is to prevent a stagnation and reversal of the air current in the case where the summer temperature approaches or slightly exceeds the temperature of the mine. At the Searing Works, near Liege, two chimneys 180 ft. in height are used for assisting the natural ventilation, and it is found that in consequence of aqueous vapour and lighter gases taken up by the air current it does not reverse during the summer.

The difference in temperature of the intake and return air current or column can often be increased by suitably arranging the doors and stoppings, so that the air current shall take one direction or other according to the time of the year; but the carrying out of such arrangements is, perhaps, only of practical use or importance in the case of mines which have levels coming directly out to the surface, and not connected with the surface only by means of shafts. It will be evident that the ventilation will be so much the greater the lower the adit level is driven, since the difference between the heights of the ascending and descending air columns, when reduced to the same temperature, will be greater, the difference between the levels of the adit mouth and the mouth of the shaft. The importance of making a suitable arrangement of the course to be taken by the ventilating current is especially important in the case of mines with workings below the adit level, which are not reached from the latter by a couple of staple pits (blind shafts). Referring to the figure given in last lecture let us suppose that it is summer time, and that the air entering the mine is of a higher temperature than the mine.

In this case it will be our object to get the air entering by the shaft A B reduced as quickly as possible to the lowest possible temperature, and then to lead it when it has acquired that temperature by the shortest way to the workings, and after having passed through these as quickly as possible to the surface. It may be the case that in descending the shaft the lowest temperature of the mine might be acquired by the air current in passing through the shaft alone, but it is evident that the average temperature of the column will only be the mean of that at the surface and the bottom of the shaft; if, however, the air be first passed through some of the upper

workings—say, between B and F—where it can acquire the lowest temperature of the mine before entering the shaft F G, the average temperature of the descending column will be greatly diminished, and consequently the difference in temperature of the ascending and descending columns increased in a rate which will generally much more than compensate for the additional frictional and other resistances experienced in passing through the upper workings. After leaving the workings which we have supposed to be between G and K, the air current should be led at once by the nearest way from the shaft K H to the shaft C D; for if the air current has acquired the lowest temperature of the mine to pass it through other workings only increases the frictional and other resistances; whilst, on the other hand, if it has not been possible to give the air current the lowest possible temperature before leaving the workings, G K, to pass it through other workings would be to communicate to the return air current a greater degree of cold than the intake, which would tend to reverse the current if it had then any distance to rise in the shaft, K H. If the workings which lower the temperature of the return air current are between C and H, the passing of the return air current through them will be disadvantageous only in respect of increased resistances.



In winter, however, when the air at the surface is considerably colder than in the mine, the air would enter at the level C, and it should then be carried by the same direct course to the workings between K and G and supposing that by the time it has left the workings it has obtained the highest temperature of the mine, it should then be led by the most direct course to the surface along the shafts G F and B A. If, however, on leaving the workings between K and G, it has not acquired the highest temperature of the mine, it would be advisable to carry it through some of the workings between F and B, to acquire a higher temperature before reaching the shaft B A. To lead it through the workings between F and B, in the case when it has already acquired the highest temperature of the mine, instead of direct from F to the shaft A B would only increase the resistances; whilst, in the other case, the increase of the difference of temperature would much more than compensate for any additional frictional resistances, &c. The air current in traversing a mine has frequently to ascend and form a level and then to descend to the same level. This occurs notably so in the case of working overhead stopes. Suppose a, b, c, d, to be such a stope. In winter the ventilating current will be diminished if, after entering the level Ka, its temperature continues to be raised whilst descending the stope, c, d, after ascending the opposite stope, a, b, for then the air column, c, d, being lighter than a, b, tends to ascend. In summer, on the contrary, the air passes in the opposite direction, and the ventilation will be considerably assisted if the air, after having ascended the stope, d, c, is still further cooled whilst descending the opposite stope, b, a; for then the air column, b, a, being heavier (as in summer), then the column, c, d, tends to cause the current to descend the stope, b, a. When the stopes communicate with levels at different heights the air current is in some cases assisted, and in others retarded.

In the case of underhand stopes the ventilation is assisted in winter if the air enters the stope by a lower level than the one by which it finds its exit, provided that the air is constantly becoming warmer whilst passing through the stope. If in summer the air current passes through the stope in the same direction, and is cooled whilst passing through the stope, the current is retarded. If in winter the air current passes from a higher to a lower level, and in doing so becomes warmer, the current is assisted, and if in summer the air current passes from a higher to a lower level, and in doing so becomes cooler, the influence of the underhand stope is unfavourable.

The influence of an overhead stope is favourable in summer when the air passes from a lower to a higher level, and in doing so becomes cooled, and the influence is also favourable in summer when the air passes from a higher to a lower level, and in doing so becomes cooled. The influence of an overhead stope is unfavourable in winter whether the current passes from a higher to a lower level or vice versa, provided that in doing so it becomes warmer.

Generally speaking the influence of an underhand stope is found to be favourable in winter and an overhead stope unfavourable for the ventilation; in summer, however, when the air current becomes cooler in passing through the stope, an overhead stope has a favourable, and an underhand stope an unfavourable influence. From the above, considerations it also follows that it is always most advantageous to lead the ventilating current direct to the deepest portion of the mine in winter; in summer, however, when the air at the surface is warmer than that underground it may be found most advantageous to pass the current through some portion of the upper workings before descending to the lower portions of the mine.

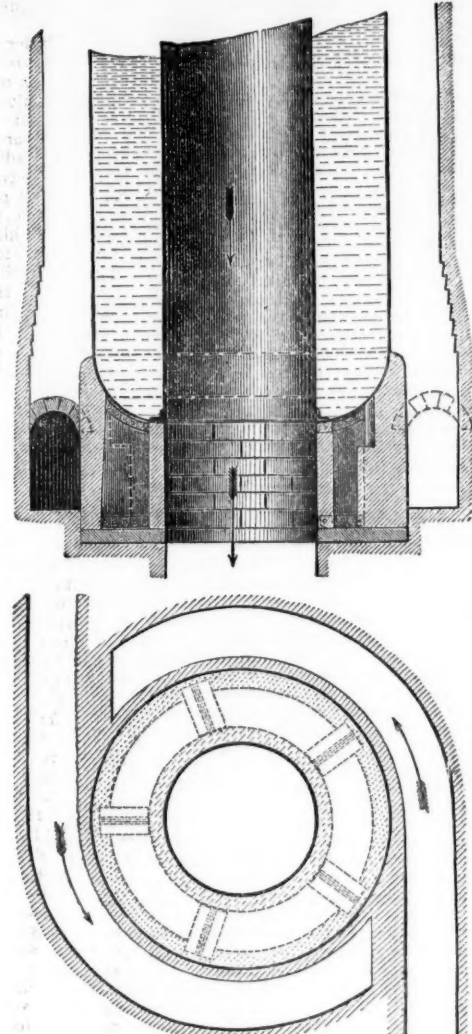
The importance of a regular observation of the temperature in various portions of a mine, especially in those which are dependent entirely on natural ventilation, will be evident from a consideration of the above; and the fact that in some cases as much as 30,000 to 40,000 cubic feet of air can be passed through a mine, will show that natural ventilation may be employed as a useful auxiliary to artificial ventilation.

**THE NIDDRIE COLLIERIES.**—The Mining Institute of Scotland, by permission of the Benhar Coal Company, on Saturday visited Niddrie Colliery for the purpose of examining the famous edge coal workings. The stated meetings of the Institute are held at Hamilton, but in view of the fact that the membership embraces men in all the mining districts, it was recently resolved to hold, at stated intervals, meetings in the various centres. Edinburgh was fixed upon in connection with the first of the meetings of this description, and with the view of making the meeting alike interesting and instructive arrangements were made to visit Niddrie. Numbering betwixt sixty and seventy, the members arrived at the colliery from all parts of Scotland, but principally from the west, about noon. They were received by Mr. Henry Aitken, chairman of the Benhar Coal Company, and Mr. Alexander McCallum, the general manager. After being served with refreshments, a descent was made into the workings of the No. 7 mine. The great peculiarity of the workings consists in the fact that the coals lie at a great angle, in some places being nearly perpendicular, and nothing of the sort being known in the west, to the majority of the members the system was entirely new, and afforded much interest. An opportunity was also given of witnessing

the operations of the large pumping-engine underground, and the surface arrangements, which are on an extensive scale, were also admired. The party having returned to Edinburgh about three o'clock, dined at the Waterloo Hotel under the genial chairmanship of Mr. Ralph Moore, Inspector of Mines for the eastern district of Scotland, president of the Institute. After dinner a general meeting was held, and papers read by Mr. McCallum descriptive of the Lothian Coalfield, and Mr. W. P. Barclay, engineer, San Francisco, on Pumping Arrangements. Mr. Wright, managing director of Joseph Wright and Co. (Limited), Tipton, Staffordshire, also explained the Berryman patent heater, and its power of heating and cleaning feed-water for steam-boilers. Votes of thanks were accorded to the authors of the papers, the Benhar Coal Company, and Mr. Moore for his presence on the occasion. The meeting was entirely successful.

## THE NATIONAL BOILER INSURANCE COMPANY (LIMITED)

SIR.—The recent disastrous explosion of a large "Rastrick" boiler at Walsall has attracted considerable attention, and various suggestions have been made in reference to the setting, &c., of this class of boiler, which is still a favourite construction with some ironworks managers; and, as many continue to be made, it is important that nothing should be omitted which will reduce the risk of working them.



I enclose illustrations showing plan of setting, which I first suggested nearly 20 years ago, and which has been adopted in many such boilers with great success by some of the largest firms in the country.

The cast-iron ring or bed-plate shown on sketch is bedded firmly on a brickwork foundation. The boiler, instead of resting directly on the bed-plate, is supported by not less than five wrought-iron plate-legs, rivetted to bottom of boiler by double 3-in. angle irons. Angle irons are also attached to the lower part of these plates, where they rest on the bed-plate. The vertical plates should be of considerable thickness.

The outer brick wall receives the first impact of the heat from the furnaces, instead of it striking the boiler-plates, the liability to fracture thus being materially reduced. The inner ring of brickwork connects the vertical tube with the passage to main flue.

Should repairs be required at lower part of boiler they can be executed without disturbing it, by simply removing the brick walls. The walls do not support the weight of boiler. If the plates are carefully attached, so that lower ends are at right angles with the axes of the boiler, is much simplified.

The above sketch is for a boiler 7 ft. diameter. The position of furnace necks can be arranged according to convenience, but it is advisable not to place them opposite the legs.

This system very much reduces the liability to injury, and also the risk of explosion of this class of boiler. I shall be glad to send copy of this to any iron firm, if they desire it, if they will write me to the address below.

I may add that I prefer internally-fired boilers for utilising the heat from iron furnaces to any of externally-fired construction, and especially on the score of safety. I know that there are sometimes practical difficulties in the way of the general adoption of the internally-fired boilers for these purposes; but am of opinion that, with suitable modification according to circumstances, these can be overcome.

Allow me to state, as some misconception has arisen in reference to the Walsall explosion, that the exploded boiler was not insured with this, the "National," Company.

HENRY HILLIER.

Chief Engineer and Manager.

The National Boiler Insurance Company (Limited),  
St. Ann's-square Manchester.

P.S.—I note a letter in the Journal of the 12th inst., which contains extracts from my last annual report. The writer also states that about 5000 boilers are insured in this, the "National" company. Had he stated 8000 he would have been near the mark.—H. H.

**LEAD SMELTING IN SPAIN.**—In 1842 there were only three lead smelting-works in the lead producing district of Carthagena, Spain, but in 1862 seventy-five works turned out 17,477 metric tons of lead. This number continued to increase until 1877, when one hundred works produced 35,000 tons.

**CHEMICALS, MINERALS, AND METALS.**—Messrs. J. Berger Spence and Co. (July 24).—Alum: Loose Lump, 6s. 7d.; ground, 7s. 5d.—Arsenic: Best white powdered, 10s. 15s.—Bleaching Powder, 5s. 17s. 6d.—Borax: Refined English, 60s.—Coppers: Green, 47s. 6d.—Copper: Sulphate, 21s. 10s.—Nitrate of Lead, 29s.—Nitrate of Soda, 15s.—Potash: 10s. 6d.—Soda: Cream Caustic, 8s. 15s.—Sulphate of Zinc, 13s. 10s.—Sulphur: Roll, 9s. 0s.; flour, 10s. 15s.—Tin crystals, 6s. 6d. per lb.—White lead, 21s. 5s.—Brimstone: Best thirds, 5s. 15s.—China-Clay, 39s.—Ochre, 5s. 15s.—Oxide of Zinc, 25s. 10s.—Talc, 5s.—Umbel, 50s.—Copper: Best ingot, 68s.; seconds ingot, 65s.—Lead: Best soft English, 15s. 10s.—Pig-Iron: Forge, 44s. 6d.; Spelter, 19s.—Tin: British common block, 92s.—Naphtha, Miscellaneous, 4s. 6d.



## ROTATING-BED STAMPING MILL.

The desirability of securing the utmost economy in the preparation of ore for market has led to almost innumerable efforts to improve upon the ordinary methods of pulverising, and although many of the old school of miners cling pertinaciously to the antiquated, slow-going Cornish stamps worked with the cumbersome cam-lifters, it cannot be doubted that the quick moving head (popularly known as the steam-hammer stamp, whether the principle of lifting be really that of the steam-hammer, of the rock drill, or other using steam) has enormous advantages both for compactness and for quantity of ore pulverised in a given time, and in the *Mining Journal* of June 12 a description was given of an improved rotating quartz mill, invented by Mr. J. Fisher, of Mincing-lane, which has the great advantage of providing a bed of some 20 or 30 square feet surface, every portion of which is so uniformly worn that the maximum durability is secured. To describe the apparatus briefly, it may be stated to consist of a slightly modified Berdan pan in which the pulverising is effected, not by balls, but by a single stamp-head lifted some 500 times per minute by an arrangement very similar to that used in the simplest forms of rock drills. As the rotation of the pan of course brings a fresh portion of the ore constantly under the head no particle can escape pulverisation, and as the steam ports and cylinder are so arranged that on the downstroke the head shall by a cushion of steam always be arrested about  $\frac{1}{4}$  in. from the bed of the pan, it is found that the wear and tear is almost inappreciable, the stamp-head itself being, in fact, the only portion which from time to time requires renewal.

During the week one of the new mills has been on exhibition in action at Messrs. Ransome and Co.'s Stanley Works, King's-road, Chelsea, and gave every satisfaction. The stone operated upon was ordinary granite road metalling, about 2 in. cube, which was quickly reduced to powder. The workmanship of the machine appeared excellent, and there is really no part likely to get out of order or to become injured by dirt or otherwise. The machine can be readily adjusted to give a heavy or a light blow so as to adapt it to the particular class of ore under treatment, and the number of blows per minute can be regulated with equal facility, and it will, of course, be understood that steam could be replaced by compressed air, which would be an important feature where water power for compression is available. In addition to the mill of course nothing but a boiler is required, and there is the further recommendation that all the fittings are extremely simple and inexpensive, and that the machine can be erected and got to work in a few hours, and can be made to do as much work in an hour as would usually require twelve. For the convenience of practical miners who may desire to test the working of the machine arrangements have been made for keeping one in operation at Messrs. Ransome's works from Wednesday, Aug. 11, to the Saturday following.

## FOREIGN MINING AND METALLURGY

Transactions in iron have slackened to some extent in the French department of the Haute-Marne. This is attributed to the indecision exhibited by merchants in consequence of their entertaining an expectation that prices will yet go considerably lower. Probably, however, this expectation has little justification in the actual facts of the case, as when the dead season is at an end a firmer tendency may be reasonably looked for. In the Nord prices have not changed, ordinary iron of commerce and construction being maintained at 87. to 87. 8s. per ton. In the Meurthe-et-Moselle it is difficult to define the price of pig-iron with any accuracy or precision. The quantity of wrought-iron imported into Paris in the first five months of this year is returned at 16,701 tons, against 8723 tons in 1879. Cast-iron was also imported into Paris in the first five months of this year to the extent of 11,824 tons, against 7952 tons in the corresponding period of 1879. The state of the iron trade appears to be somewhat better in Styria as well as in Hungary; a slight improvement in quotations is even spoken of. There is no important change to report in the general aspect of the German iron trade. Casting pig maintains its recent advance of 2s. 6d. to 3s. 3d. per ton; Bessemer pig has risen at the same time as English hematite pig. Steel rails have been in rather languid demand, but new orders are anticipated.

An adjudication has just taken place in Belgium of 23,000 tons of steel rails, to be paid for wholly in cash. The lowest tender was submitted by an English firm—the Railway Supply Association—which offered to deliver the rails at 57. 19s. 2d. per ton, free at Antwerp. A telegram making this proposal arrived, however, after the hour fixed for the reception of tenders. The Belgian steelworks generally vanquished their German competitors in their tenders. The John Cockerill Company offered to supply 10,000 tons at 67. 6s. 6d. per ton, 5000 tons at 67. 8s. per ton, 5000 tons at 67. 7s. 8d. per ton, and 3000 tons at 67. 3s. 3d. per ton. The Angleur and Seclissin Works acquired slightly higher terms. In the case of a contract for 10,000 tons of steel rails, to be paid for in part by 10,000 tons of old iron rails and the balance in cash, the Rhymney Iron Company (Limited) tendered at very low rates, so low, indeed, as to lead to the conclusion that energetic English companies can now deliver steel rails in Belgium at a less price than Belgian producers. M. Van Scherpenzeel Thim reports that the production of the blast-furnaces of the province of Liège in 1879, was 149,751 tons, as compared with 172,422 tons in 1878. The production of the ironworks of the province last year was 115,324 tons, as compared with 404,041 tons in 1878.

Some coal contracts of some little importance have just been let in Belgium. The tenders received were on an average 1s. 8d. per ton higher than those submitted at the corresponding period of 1879. It is noticed also that the tenders submitted were almost uniform in their terms. These facts are regarded as proofs that the general condition of the Belgian coal trade is favourable. The recent tenders, it should be added, embrace deliveries to the aggregate amount of 200,000 tons. The crop of sugar beet has been looking well this season in Belgium, and a good sugar season is anticipated; should this anticipation be realised the result would strengthen still further the Belgian coal trade. The report for 1879 of M. Van Scherpenzeel-Thim, mining engineer-in-chief for the province of Liège, states that the total extraction of coal in the province in 1879 amounted to 3,581,305 tons, as compared with 3,481,432 tons in 1879. Working operations were attended, upon the whole, with a small loss in 1879. The Gosson-Lagasse Colliery Company was, however, worked at a profit of 16,772l. last year. There is little change to report in the French coal trade. It is noticed, however, that a commencement has been made with the laying in of supplies for the winter. Quotations have not varied.

Reviewing the prospects of gold mining in California, Mr. Booker, our Consul at San Francisco, says, in a report just issued, that there is no reason to apprehend a falling off in the yield unless there should be legislative action with respect to hydraulic mining, from which two-thirds of the metal obtained are derived. The yield altogether last year was fully \$17,000,000. The Bodie district, due east from San Francisco and near the Nevada line, has several excellent quartz mines, the yield from which is increasing. Last year \$2,556,850 worth of bullion from them was shipped, a little over 10 per cent. of this amount representing silver. The quartz varies materially, the proportion of silver being sometimes 30 per cent. of the total bullion. Both the hydraulic and the quartz mines are being worked energetically and profitably. A good many new hydraulic enterprises have been started, and were it not for the difficulty in disposing of the debris there would be still greater activity in this branch of gold mining. Two or three suits have been brought against the companies by farmers who have had their land deteriorated in value by the deposit from the mines; but these actions have not been successful, owing to the difficulty of fixing the responsibility upon any particular company. The damage done to lands bordering the rivers will, sooner or later, be settled either by legislative action or by arrangement between the persons interested; but the most serious question which is presenting itself is with respect to the damage done to navigation on the rivers and bays. The Federal authorities are taking steps for a full investigation. Meanwhile there are large tracts of land which would be benefited by receiving the deposits, if some plan other than that of conveying the debris by tunnels to the

## JOSEPH FIRTH AND SONS' IMPROVED PATENT BRICK-MAKING MACHINE

WILL BE EXHIBITED AT THE YORKSHIRE AGRICULTURAL SHOW AT BARNLEY, AUGUST 3, 4, AND 5

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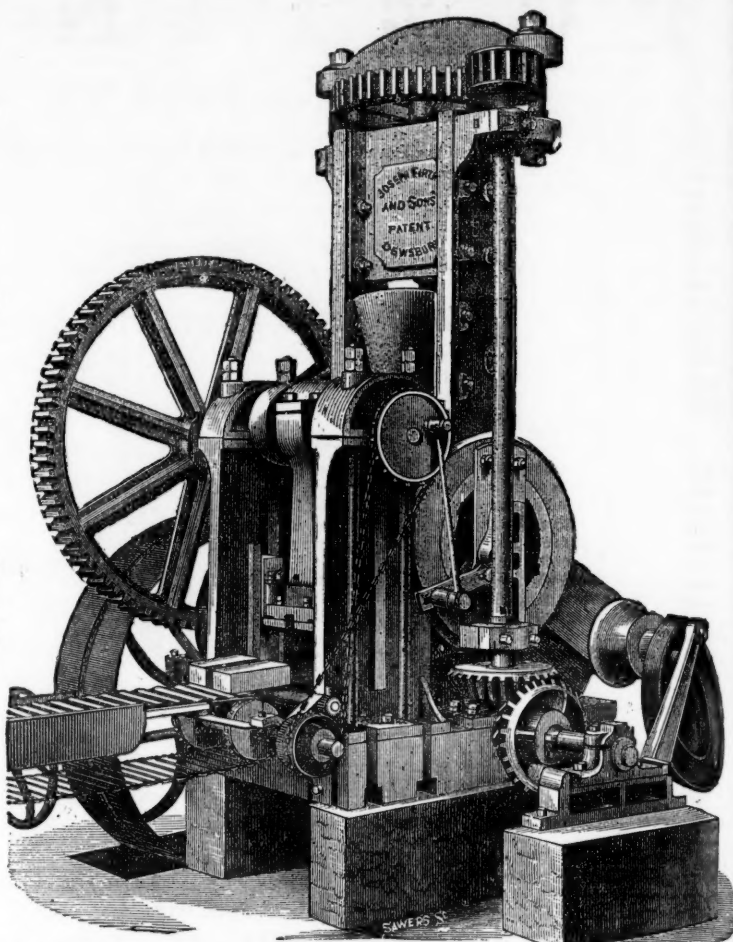
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It makes two bricks at once, and will make 12,000 to 14,000 Plastic Pressed Bricks per day, hard enough to go direct to the Kiln without drying; or it will make the bricks thoroughly plastic if required. For Works requiring a Machine at less cost the Machine is made to turn out one brick at once, and is capable of producing 8000 bricks per day.



The Machine can be seen at work daily at the Brickworks of the Patentees, Joseph Firth and Sons, Webster Hill, Dewsbury, as also their Patent Gas Kiln for Burning Bricks, which possesses the following amongst other advantages, viz.:—Economy in Fuel, Rapidity and Quality of Work, even Distribution of Heat, and Total Consumption of Smoke.

nearest river could be devised, so that it might be distributed in the right places. It has been ascertained that 18,000 acres of the finest bottom land in the State, situated in the valley of the Yuba, have been converted into a barren desert by the deposits, and that as much or more good land has been destroyed on the Bear river. It is calculated that since the beginning of hydraulic mining 162,000,000 cubic yards of material have been sluiced out of the hydraulic mines into the Yuba and its tributaries. The bed of the Yuba at Marysville is now filled up almost to the level of the streets of the city, where, prior to the era of hydraulic mining, there was a well-defined channel from 20 ft. to 25 ft. deep. Suisun Bay is being rapidly filled up, and unless a change is made in the method of treating the debris San Pablo Bay will become the next place of deposit, to be followed finally by the rapid growth of shoals in San Francisco Bay and the eventual destruction of its harbour. When it is remembered that hydraulic mining is at present regarded as the most reliable future source of gold supply, and the importance of the United States yield is also taken into consideration, the serious nature of the problem which is presented for solution becomes apparent.

CASSELL'S PUBLICATIONS.—The History of Protestantism, part 14, extends from the disputation at Baden to the Augsburg Confession and the death of Zwingle. Science for All, part 33, contains the conclusion of the article Chemistry of a Color Box; Getting Warm, by William Ackroyd; How we Classify Living Beings, by Andrew Wilson; Science from Penny Toys, by John A. Bower; Comets, by W. F. Denning. Knight's Practical Dictionary of Mechanics, part 44, extends from Malleable Iron to Match. The twenty-ninth plate—a well-executed lithogram showing the progress of mapping from B.C. 900 to A.D. 1520, accompanies this part.

LETT'S POPULAR ATLAS.—The fifth and sixth parts of this Atlas have now been issued. The former includes a two-sheet map of Australia, in which the wool growing districts and sheep runs are approximately shown, and a brightly coloured map of Switzerland, showing the cantons, lakes, glaciers, as well as the French and German names, which, as they frequently differ widely from each other, Vierwaldstattersee and Lucerne representing the same lake, Sion and Sitten the same town, and so on, are very necessary for travellers. Part 6 includes maps of the Western Hemisphere, Russia, and New Zealand, either of which is worth twice the price of the entire part.



W. TREGAY, Mining Engineer, REDRUTH, Having had many years' practical experience in Metallic Mines, is prepared to INSPECT, REPORT, and ADVISE on every description of MINERAL PROPERTY.

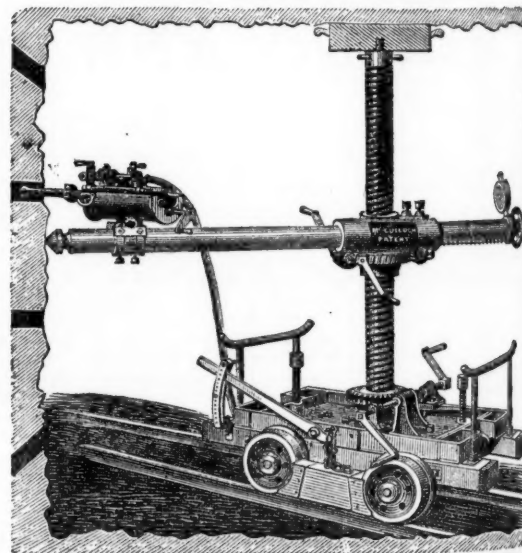
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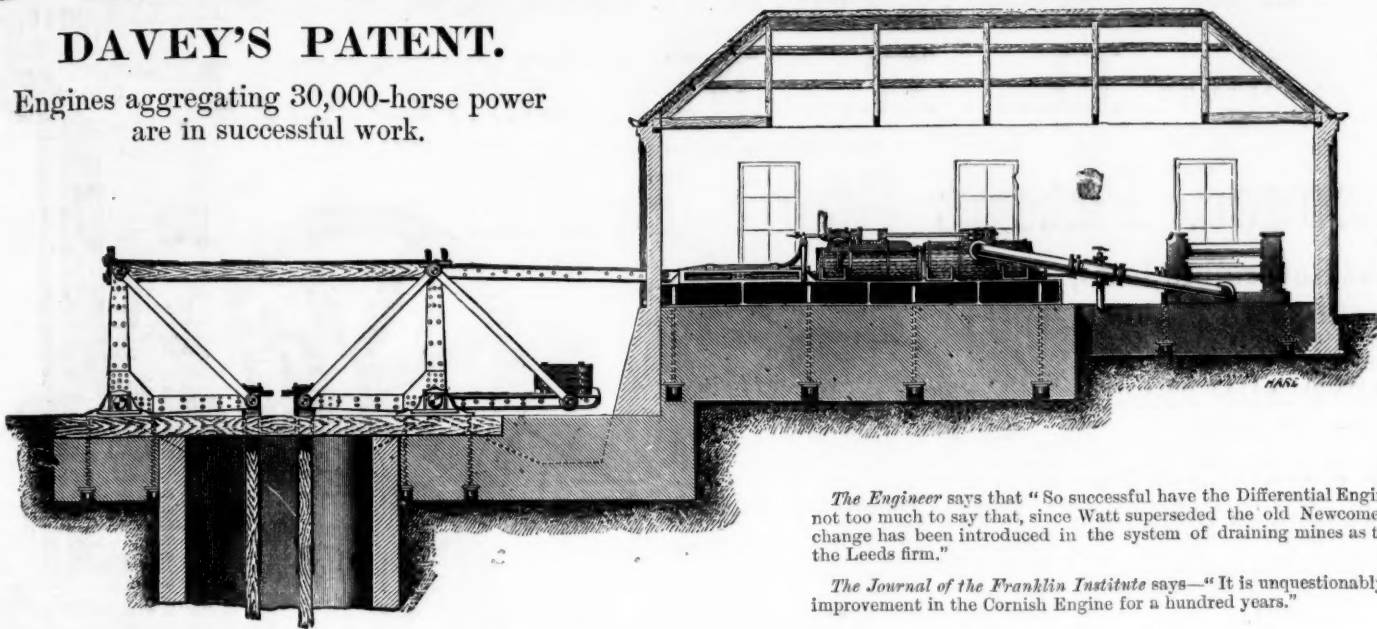
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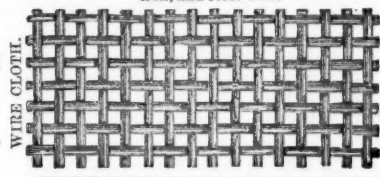
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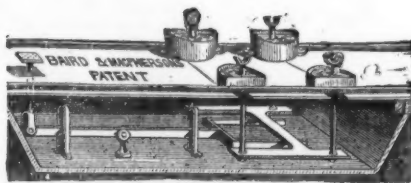
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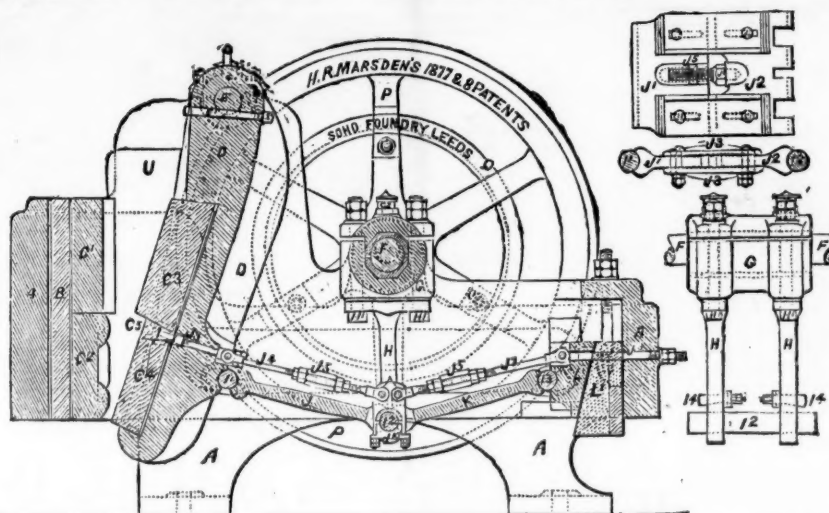
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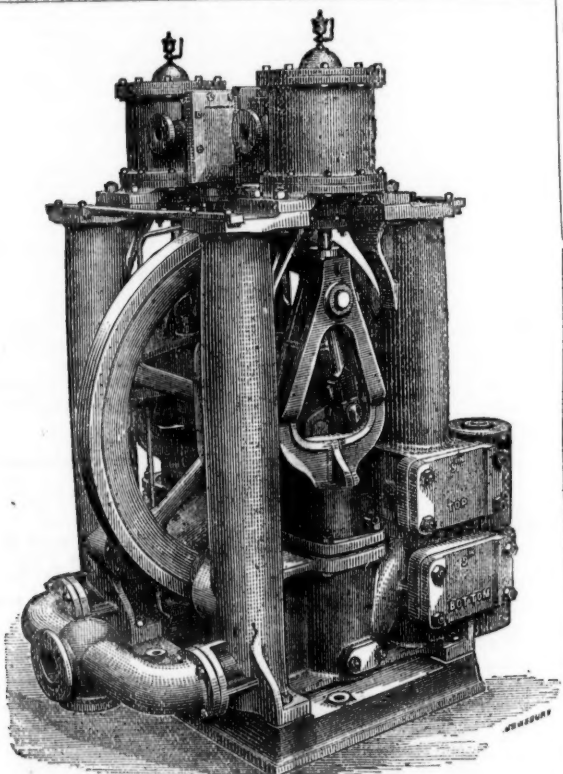
BLAKE'S STONE BREAKER.—Statement made by the Managing Director of the St. John del Rey Mining Company, Mr. John Hockin, with regard to six months' practical working of Blake's Stone Breaker, affording facility for judging of the relative economy of machine and hand labour in this kind of work, and also of the cost of getting the Stone Breaker to work in difficult places. The price paid to Mr. Marsden for the machine referred to by Mr. Hockin was £180, and adding to this the cost of engine, carriage, and fixing, the aggregate cost to the company of the Breaker in working order was £500. By this outlay the company is enabled to dispense with the labour of 55 people, the value of which is £800 per annum. The cost of working the machine could not be more than the wages of about five men (the machine requires but one man to feed it, so that the rest would be for engineer, fuel, oil, &c.), and allowing for interest on outlay and for renewal when necessary, the saving must be enormous.—Mining Journal.

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